S. HRG. 102-5 (Pt. 2)

NATIONAL ENERGY SECURITY ACT OF 1991

(Title III and Subtitles A and B of Title IV)

HEARING

BEFORE THE

COMMITTEE ON ENERGY AND NATURAL RESOURCES UNITED STATES SENATE

ONE HUNDRED SECOND CONGRESS

FIRST SESSION

ON

S. 341

TO REDUCE THE NATION'S DEPENDENCE ON IMPORTED OIL, TO PROVIDE FOR THE ENERGY SECURITY OF THE NATION AND FOR OTHER PURPOSES

FEBRUARY 26, 1991

PART 2

Printed for the use of the
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NATIONAL ENERGY SECURITY ACT OF 1991

(Title III and Subtitles A and B of Title IV)

TUESDAY, FEBRUARY 26, 1991

U.S. SENATE,
COMMITTEE ON ENERGY AND NATURAL RESOURCES,
Washington, DC.

The committee met, pursuant to notice, at 9:40 a.m., in room SD-366, Dirksen Senate Office Building, Hon. J. Bennett Johnston, chairman, presiding.

OPENING STATEMENT OF HON. J. BENNETT JOHNSTON, U.S. SENATOR FROM LOUISIANA

The CHAIRMAN. The hearing will come to order. In another committee on which I serve, the Defense Appropriations Subcommittee, we are dealing today with the cost of the war in the Gulf. The cost in the war in the Gulf is tremendous both in terms of lives and in terms of dollars. Better than we had feared, but still a tremendous cost. At bottom, that war has been caused by energy. Many other reasons, in addition to energy, have motivated us to go into Kuwait. But at bottom it is really what constitutes the third energy crisis. It is time for this country to act, to act comprehensively, to act effectively.

The National Energy Security Act of 1991, introduced by Senator Wallop and I, is designed to do just that. It is a balanced energy act. That is, it balances on the one hand what is sometimes called the soft path—conservation, renewables, alternative energy—with production on the other hand. Politically and policy-wise, it would be impossible, in my view, to pass either a sole production bill, or a sole renewables and conservation bill. That is why this act is a balanced act designed to emphasize both conservation, renewables, and production.

Energy efficiency, which we are dealing with today, is not a new idea. Energy conservation has helped the United States dramatically reduce its energy consumption. The Department of Energy estimates that gains in energy efficiency have enabled the U.S. economy to grow by 46 percent since 1973, while increasing energy requirements by only 7 percent.

Despite the establishment and success of many conservation programs, the 1980's saw a general decline in Federal support, and in some cases, total neglect of these initiatives. The National Energy Security Act will provide the Secretary of Energy with considerable financial resources in the form of revenues from ANWR to reinvig-

orated underfunded efficiency and renewable programs, strengthen existing programs, and initiate new programs in critical energy use sectors of the economy.

Title III of the bill encompasses a variety of regulatory and financial measures aimed at increasing energy efficiency in the residential, commercial, and industrial sectors of the economy. Many of the bill's provisions are aimed at amending existing law in order to either revive current programs or encourage the expansion of programs that are too narrow in focus. Examples of these programs include: appliance standards, commercial and residential building standards, and the Federal Energy Management Program.

The Johnston-Wallop legislation recognizes the complex problem of integrating the various roles that Federal and State governments, utilities, and the private sector must play in the development and execution of the energy efficiency and renewable-energy programs.

Title IV of the National Energy Security Act builds on last year's Renewable Energy and Energy Efficiency Technology Competitiveness Act by continuing research, development, and demonstration of renewable energy technologies in order to overcome the barriers that have prevented widespread commercialization.

In addition, title IV strengthens the mandate of the interagency committee on Renewable Energy Commerce and Trade, which goes by the pseudonym CORECT, which promotes the adoption of commercially viable renewable energy technologies in lesser developed countries.

I applaud the administration for its decision to increase funding for energy efficiency and renewable energy research and development. I am also pleased that the NES has identified many areas where energy efficiency and renewable energy policies can be strengthened. However, I feel that opportunities exist to enhance the proposal set forth in the President's strategy.

It is important to note that this committee is in a unique position to play a leading role in the development of a national energy strategy that meets our Nation's energy, environmental, and economic challenges. I believe that titles III and IV of the committee package builds successfully on our past legislative achievements in developing cost-effective energy efficiency and renewable energy programs, while addressing future challenges.

Today's witnesses have had extensive experience in the fields of energy efficiency and renewable energy at the Federal and State level within regulatory commissions, utilities, and the private sector. I urge today's witnesses to draw on this experience in providing a frank critique of our bill. We need to know how the bill can be strengthened and where additional programs may be justified in order to achieve the benefits of greater efficiency and use of renewable energy. We intend to be bold in this energy legislation. The committee looks forward to bold suggestions from all of our witnesses.

Before we begin with the first panel, I would like to call on the distinguished Ranking Minority Member, Senator Wallop.

[The text of title III and subtitles A and B of title IV of S. 341 and a statement of Senator Bingaman follow:]

II

102D CONGRESS
1ST SESSION

S. 341

To reduce the Nation's dependence on imported oil, to provide for the energy security of the Nation and for other purposes.

IN THE SENATE OF THE UNITED STATES

FEBRUARY 5 (legislative day, JANUARY 3), 1991

Mr. JOHNSTON (for himself and Mr. WALLOP) introduced the following bill; which was read twice and referred to the Committee on Energy and Natural Resources

---

A BILL

To reduce the Nation's dependence on imported oil, to provide for the energy security of the Nation and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That this Act may be referred to as the "National Energy Security Act of 1991".

* * * * * * *

9

TITLE III—ENERGY EFFICIENCY

Subtitle A—Industrial, Commercial and Residential

SEC. 3001. BUILDING ENERGY EFFICIENCY STANDARDS.—Title III of the Energy Conservation and Production Act, (48 U.S.C. 6835) is amended by:

(a) In section 304(a)(4), striking the words "Federal buildings" and inserting in lieu thereof, "Federal buildings and public housing,";

(b) Striking the existing section 306 and inserting in lieu thereof the following:

"SEC. 306. COMPLIANCE.

"(a) FEDERAL BUILDINGS.—The head of each Federal agency shall adopt such procedures as may be necessary to assure that the construction of any new Federal building

meets or exceeds the applicable energy efficiency performance standards promulgated pursuant to section 304(a).

"(b) PUBLIC HOUSING.—Effective three years after the date of the enactment of the National Energy Security Act of 1991, the Secretary of Housing and Urban Development shall adopt such procedures as may be necessary to assure that any newly constructed public housing unit meets or exceeds the applicable energy efficiency performance standards promulgated pursuant to section 304(a)."; and

(c) Redesignating the existing section 308 as subsection (a) and adding at the end thereof, the following new subsection:

"(b) The Secretary may provide financial assistance to the States, and to units of local government that have jurisdiction over building energy conservation standards, and which intend to adopt energy conservation standards consistent with the standards promulgated under this Part for commercial buildings, to assist them in furthering the design and construction of energy efficient commercial buildings.".

(d) CONFORMING AMENDMENT.—Strike section 109 of the Cranston-Gonzalez National Affordable Housing Act (Public Law 101–625) and insert in lieu thereof the following: "The Secretary of Housing and Urban Development shall, not later than one year after the enactment of the National Energy Security Act of 1991, adopt the energy conser-

vation performance standards for new buildings as promulgated by the Secretary of Energy pursuant to section 304 of the Energy Conservation and Production Act (Public Law 94–385), as amended, for new construction of public and assisted housing and single-family and multifamily residential housing (other than manufactured homes) subject to mortgages under the National Housing Act.".

SEC. 3002. RESIDENTIAL ENERGY EFFICIENCY RATINGS.—(a) AMENDMENT TO NATIONAL ENERGY CONSERVATION POLICY ACT.—Title II of the National Energy Conservation Policy Act (Public Law 95–619) is hereby amended by adding a new part 6 as follows:

"PART 6—RESIDENTIAL ENERGY EFFICIENCY RATINGS

"SEC. 271.—RATINGS.—(a) Within twelve months after the date of the enactment of the National Energy Security Act of 1991, the Secretary, in consultation with the Secretary of Housing and Urban Development, shall, by rule, promulgate guidelines for procedures to be implemented by State governments that would enable the assignment of an energy efficiency rating to residential buildings.

"(b) The guidelines under subsection (a) shall—

"(1) provide for a numerical rating of the efficiency with which any residential building may be supplied with heating and cooling energy on an annual basis,

and evaluate the practicality of including major energy consuming appliances in such rating;

"(2) provide that all residential buildings can receive a rating at the time of sale;

"(3) ensure that the rating is prominently communicated to potential buyers and renters;

"(4) ensure that the rating system is designed to facilitate its use by lenders and the secondary mortgage markets to promote energy efficiency; and

"(5) ensure that the rating system is consistent with and supports the uniform plan for mortgage financing incentives required under section 946 of the Cranston-Gonzales National Affordable Housing Act (Public Law 101–625).

"SEC. 272.—TECHNICAL ASSISTANCE.—Within twelve months after the date of enactment of the National Energy Security Act of 1991, the Secretary shall establish a program to provide technical assistance for State and local organizations adopting residential energy efficiency rating systems or building codes.".

(b) CONFORMING AMENDMENT.—The National Energy Conservation Policy Act is further amended by adding in the table of contents at the end of title II, the following items:

"PART 6—RESIDENTIAL ENERGY EFFICIENCY RATINGS

"Sec. 271. Ratings.
"Sec. 272. Technical Assistance.".

SEC. 3003. IMPROVING EFFICIENCY IN ENERGY-INTENSIVE INDUSTRIES.—(a) SECRETARIAL ACTION.—The Secretary, acting in accordance with authority contained in the Federal Nonnuclear Energy Research and Development Policy Act of 1974 (42 U.S.C. 5901–5920) and other applicable laws, shall—

(1) pursue a research and development program intended to improve energy efficiency and productivity in energy intensive industries and industrial processes; and

(2) undertake joint ventures to encourage the commercialization of technologies developed under paragraph (1).

(b) JOINT VENTURES.—(1) The Secretary shall—

(A) conduct a competitive solicitation for proposals from specialized private firms and investors for such joint ventures under subsection (a)(2); and

(B) provide financial assistance to at least five such joint ventures.

(2) The purpose of the joint ventures shall be to design, test and demonstrate changes to industrial processes that will result in improved energy efficiency and productivity. The joint ventures may also demonstrate other improvements of benefit to such industries so long as demonstration of energy

efficiency improvements is the principal objective of the joint venture.

(3) In evaluating proposals for financial assistance and joint ventures under this section, the Secretary shall consider—

(A) whether the research and development activities conducted under this section improve the quality and energy efficiency of industries or industrial processes;

(B) the regional distribution of the energy intensive industries and industrial processes; and

(C) whether the proposed joint-venture project would be located in the region which has the energy-intensive industry and industrial processes that would benefit from the project.

(c) AUTHORIZATION.—There is authorized to be appropriated to the Secretary $5,000,000 for fiscal year 1992, $15,000,000 for fiscal year 1993, and $25,000,000 for fiscal year 1994, to carry out the purposes of this section.

SEC. 3004. REPORT.—(a) REPORT.—The Secretary, in consultation with the Council of Economic Advisors, shall submit to the Congress within one year after the date of the enactment of this Act, and every three years thereafter through the year 2004, a report setting forth energy efficiency policy options that would both decrease domestic oil

consumption and overall domestic energy consumption by 1, 2, 3, and 4 per centum, per-year per-unit of Gross National Product, through the year 2005, below the projected consumption for 2005. The Secretary shall evaluate, describe and rank these policy options according to their cost-effectiveness and their feasibility of implementation.

(b) REPEAL.—Title III of the Energy Security Act (42 U.S.C. 7361, et. seq) is hereby repealed.

SEC. 3005. VOLUNTARY GUIDELINES FOR INDUSTRIAL PLANTS—(a) VOLUNTARY GUIDELINES FOR ENERGY EFFICIENCY AUDITING AND INSULATING.—Within one year after the date of the enactment of this Act, the Secretary, after consultation with utilities, major industrial energy consumers and representatives of the insulation industry, shall establish voluntary guidelines for:

(1) the conduct of energy efficiency audits of industrial facilities to identify cost-effective opportunities to increase energy efficiency; and

(2) the installation of insulation to achieve cost-effective increases in energy efficiency in industrial facilities.

(b) EDUCATION AND TECHNICAL ASSISTANCE.—The Secretary shall conduct a program of education and technical assistance to promote the use of the voluntary guidelines established under subsection (a).

(c) ANNUAL REPORT.—The Secretary shall report annually on activities conducted pursuant to this section, including an evaluation of the effectiveness of these guidelines, and the responsiveness of the industrial sector to these guidelines.

(d) AUTHORIZATION.—There is authorized to be appropriated $750,000 annually to carry out the purposes of this section.

SEC. 3006. ENERGY EFFICIENCY LABELING FOR WINDOWS AND WINDOW SYSTEMS.—(a) DEVELOPMENT OF PROGRAM.—Not later than one year after the date of enactment of this Act, the Secretary shall, in consultation with the National Fenestration Rating Council, industry representatives, and other appropriate organizations, provide financial and technical assistance to support the voluntary development of a national window rating program to establish energy efficiency ratings for windows and window systems. Such program shall set forth information and specifications that will enable purchasers of windows or window systems to make more informed purchasing decisions based upon the potential cost and energy savings of alternative window products.

(b) SECRETARIAL ACTION.—If a national window rating program, consistent with the objectives of subsection (a), is not established within two years of the date of enact-

ment of this Act, then the Secretary shall, in consultation with the National Institute of Standards and Technology, develop, within one year, a rating program to establish energy efficiency ratings for windows and window systems under section 323 of the Energy Policy and Conservation Act (42 U.S.C. 6293).

(c) FEDERAL TRADE COMMISSION RULES.—The Federal Trade Commission (hereinafter in this section, the "Commission") shall prescribe labeling rules under section 324 of the Energy Policy and Conservation Act (42 U.S.C. 6294) for the rating program established pursuant to either subsection (a) or (b) of this section, unless the Commission determines that labeling in accordance with subsections (a) or (b) of this section is not technologically or economically feasible or is not likely to assist consumers in making purchasing decisions with respect to any type of window or window system (or class thereof).

(d) COVERED PRODUCTS.—For purposes of sections 323 and 324 of the Energy Policy and Conservation Act, windows and window systems shall be considered covered products under section 322 of such Act (42 U.S.C. 6292) unless excluded by the Commission pursuant to subsection (c).

(e) AUTHORIZATION.—There is authorized to be appropriated to the Secretary $750,000 for each of the fiscal years

1992, 1993, and 1994 to carry out the purposes of this section.

SEC. 3007. ENERGY EFFICIENCY INFORMATION.—(a) DATA ON ENERGY EFFICIENCY.—Pursuant to Section 52(a) of the Federal Energy Administration Act of 1974, (Public Law 93–275) and after consultation with State and Federal energy officials, representatives of energy using classes and sectors, and representatives of energy policy public-interest or research organizations, the Administrator of the Energy Information Administration shall expand the scope and frequency of the data it collects and reports on energy use in the United States with the objective of significantly improving the ability to evaluate the effectiveness of the Nation's energy efficiency policies and programs. The Administrator shall take into account reporting burdens and the protection of proprietary information as required by law. In expanding the collection of such data to meet this objective, the Administrator shall consider—

(1) expanding data collection to include energy intensive sectors not presently covered in Energy Information Administration surveys;

(2) increasing the frequency with which the Energy Information Administration conducts end-use energy surveys among households, commercial buildings, and manufacturing;

(3) expanding the survey instruments to include questions regarding participation in government and utility conservation programs, the energy efficiency of existing stocks of equipment and structures, and recent changes in the technical efficiency and operating practices that affect energy use;

(4) expanding the time period for which fuel-use data is collected from individual survey respondents;

(5) expanding the sample sizes for fuel-use surveys in order to improve the accuracy of subgroups of energy users; and

(6) expanding the scope and frequency of data collection on the energy efficiency and load-management programs operated by electric and gas utilities.

(b) ANNUAL REPORT.—The Administrator shall report annually to Congress on the energy efficiency in classes and sectors of the economy and on any data resulting from this section.

SEC. 3008. ENERGY EFFICIENCY LABELING FOR LAMPS AND LUMINAIRES.—(a) DEVELOPMENT OF PROGRAM.—Not later than one year after the date of enactment of this Act, and in consultation with the National Electric Manufacturers Association, industry representatives, and other appropriate organizations, the Secretary shall provide financial and technical assistance to support the voluntary

development of a national energy efficiency rating program for lamps and luminaries. Such program shall set forth information and specifications that will enable purchasers of lamps and luminaries to make informed decisions among the energy efficiency and cost of alternative lamps and luminaries.

(b) SECRETARIAL ACTION.—If a national energy efficiency rating and labeling program consistent with the objectives of subsection (a) is not voluntarily established within two years of the date of enactment of this Act, then the Secretary shall, in consultation with the National Institute of Standards and Technology, develop, within one year, a rating program for lamps and luminaries under section 323 of the Energy Policy and Conservation Act (42 U.S.C. 6293).

(c) FEDERAL TRADE COMMISSION RULES.—The Federal Trade Commission (hereinafter in this section, the "Commission") shall prescribe labeling rules under section 324 of the Energy Policy and Conservation Act (42 U.S.C. 6294) for lamps and luminaries, except to the extent that the Commission determines that labeling in accordance with subsection (b) of this section is not technologically or economically feasible or is not likely to assist consumers in making purchasing decisions with respect to any type of lamp or luminarie (or class thereof).

(d) COVERED PRODUCTS.—For purposes of sections 323 and 324 of the Energy Policy and Conservation Act,

lamps and luminaries shall be considered covered products under section 322 of such Act (42 U.S.C. 6292) unless excluded by the Commission pursuant to subsection (c).

(e) AUTHORIZATION.—There is authorized to be appropriated to the Secretary $750,000 for each of the fiscal years 1992, 1993, and 1994 to carry out the purposes of this section.

SEC. 3009.—COMMERCIAL AND INDUSTRIAL EQUIPMENT EFFICIENCY STANDARDS.—(a) DEFINITIONS.—Section 340(2)(B) of title III part C of the Energy Policy and Conservation Act (42 U.S.C. 6311) is hereby amended:

(1) by deleting "and" at the end of clause (xiii), replacing the period at the end of clause (xiv) with "; and", and inserting the following new clause:

" (xv) utility distribution transformers.".

(b) TECHNICAL AMENDMENT.—Section 342(b)(1) of title III, part C of the Energy Policy and Conservation Act (42 U.S.C. 6313) is hereby amended by deleting "(other than electric motors or pumps)" and inserting in lieu thereof the following: ", other than electric motors or pumps, electric lights, and utility distribution transformers,".

(c) STUDY.—Section 342 of title, III part C of the Energy Policy and Conservation Act (42 U.S.C. 6313) is hereby amended:

(1) by redesignating paragraph (b) as amended, as paragraph (c) and inserting a new paragraph (b) to read as follows:

"(b) Not later than eighteen months after the date of the enactment of the National Energy Security Act of 1991, the Secretary shall—

"(1) evaluate electric lights and utility distribution transformers to—

"(A) determine standard classifications with respect to size, function, type of energy used, method of manufacture, or other factors which may be appropriate for purposes of this part;

"(B) determine the practicability and effects of requiring all or part of the classes of electric lights and utility distribution transformers determined under subparagraph (A) to meet performance standards establishing minimum levels of energy efficiency; and

"(C) determine the practicability and cost-effectiveness and potential energy savings of replacing existing utility distribution transformers.

"(2) submit a report to the Congress on the results of such evaluation, together with such recommendations for legislation as he considers appropriate.".

(d) REEVALUATION OF ELECTRIC MOTORS AND PUMPS.—Pursuant to section 342 of title III part C of the Energy Policy and Conservation Act (42 U.S.C. 6313), the Secretary shall—

(1) conduct a reevaluation of electric motors and pumps to determine the practicability and effects of requiring all or part of the classes of electric motors and pumps determined under subparagraph (A) of section 342(a)(1) of the Energy Policy and Conservation Act to meet performance standards establishing minimum levels of energy efficiency; and

(2) submit a report to Congress on the results of such evaluation, together with such recommendations for legislation as he considers appropriate. The report under this subsection may include the report pursuant to section 342(b)(2) of the Energy Policy and Conservation Act.

Subtitle B—Federal Energy Management

SEC. 3101. FEDERAL ENERGY MANAGEMENT AMENDMENTS.—Part 3 of title V of the National Energy Conservation Policy Act (NECPA) (42 U.S.C. 8251 et seq.), as amended, is further amended as follows:

(a) In section 543:

(1) strike subsection (a) and insert the following new text in lieu thereof:

"(a) ENERGY MANAGEMENT REQUIREMENT FOR FEDERAL BUILDINGS.—(1) Not later than January 1, 2000, each Federal agency shall, to the maximum extent practicable, install in Federal buildings under the control of such agency in the United States, all energy conservation measures with payback periods of less than ten years as calculated using the methods and procedures developed pursuant to section 544. Within two years after the date of enactment of the National Energy Security Act of 1991, each agency shall submit to the Secretary a list of projects meeting the ten-year payback criterion, the energy that each project will save and total energy and cost savings involved.

"(2) An agency may exclude from the requirements of paragraph (1) any Federal building or collection of Federal buildings, and the associated energy consumption and gross square footage, if the head of such agency finds that compliance with the requirements of paragraph (1) would be impracticable. A finding of impracticability shall be based on the energy intensiveness of activities carried out in such Federal buildings or collection of Federal buildings, the type and amount of energy consumed, the technical feasibility of making the desired changes, or the unique character of many facilities operated by the Departments of Defense and Energy. Each agency shall identify and list in each report made under section 548, the Federal buildings designated by

it for such exclusion. The Secretary shall review such findings for consistency with the impracticability standards set forth herein, and may within ninety days after receipt of the findings, reverse a finding of impracticability, in which case the agency shall comply with the requirements of paragraph (1). This section shall not apply to an agency's facilities that generate or transmit electric energy, nor to the uranium enrichment facilities operated by the Department of Energy.";

(2) In subsection (b):

(A) after the words "subsection (a)," insert the following: "The Secretary of Energy shall consult with the Secretary of Defense and the Administrator of the General Services Administration in developing guidelines for the implementation of this part, and";

(B) strike the phrase "Federal Energy Management Improvement Act of 1988," in paragraph (1) and insert in lieu thereof "National Energy Security Act of 1991, and submit to the Secretary of Energy";

(C) after the words "high priority projects;" insert the following: "and such plan shall include steps to take maximum advantage of contracts authorized under title VIII of this Act (42 U.S.C. 8287 et seq.), financial incentives, and other serv-

ices provided by utilities for efficiency investment and other forms of financing to reduce the direct costs to the government;";

(D) at the end of paragraph (2), strike the semicolon and insert the following: ", and update such surveys periodically, but not less than every three years;";

(E) replace paragraph (3) with the following new paragraph:

"(3) using such surveys, determine the cost and payback period of energy conservation measures likely to achieve the goals of this section;"; and

(F) insert a new paragraph (4) as follows, and renumber paragraph (4) as "(5)":

"(4) install those energy conservation measures that will attain the requirements of this section in a cost-effective manner as defined in section 544, and".

(b) In section 544:

(1) strike "National Bureau of Standards," in subsection (a) and insert in lieu thereof "National Institute of Standards and Technology,"; and

(2) strike all after the word "each", in paragraph (b)(2) and insert in lieu thereof: "agency shall, after January 1, 1994, fully consider the energy efficiency of all potential building space at the time of renewing or

entering into a new lease. Further, all Government leased space constructed after January 1, 1994, shall meet model Federal energy conservation performance standards for new commercial buildings promulgated pursuant to section 304 of the Energy Conservation and Production Act (Public Law 94–385).".

(c) In section 545, add after the word "measures" the following: "as needed to meet the requirements of section 543.".

(d) In section 546, strike subsection (b) and insert in lieu thereof the following:

"(b) IMPLEMENTATION.—To facilitate the financing of energy conservation measures, each Federal agency shall promote the use of contracts authorized by title VIII of this Act (42 U.S.C. 8287 et seq.). The Secretary, in consultation with the Secretary of Defense and the Administrator of the General Services Administration, within six months after the date of the enactment of the National Energy Security Act of 1991, shall develop appropriate procedures and methods for use by Federal agencies to select energy service contractors that will achieve the intent of this section in a cost-effective manner. Notwithstanding any other procurement laws and regulations, such procedures and methods shall apply to the selection of energy service contractors by each Federal agency.".

(e) In section 548:

(1) strike the word "Each" in subsection (a) and insert in lieu thereof the following: "In addition to the plan required to be submitted to the Secretary pursuant to section 543(b)(1), each";

(2) insert the phrase "by April 2 of each year," after the word "annually" in subsection (b); and

(3) insert the words "by each agency", after the words "under this part" in subsection (b)(1).

(f) At the end of part 3, add the following new sections:

"SEC. 552. UTILITY INCENTIVE PROGRAMS.—Federal agencies are permitted and encouraged to participate in programs conducted by any gas or electric utility for the management of energy demand or for energy conservation in federally owned or leased facilities. Federal agencies may accept incentives designed to encourage energy demand management or energy conservation, generally available from any such utility to its customers, to adopt technologies and practices that are determined to be cost-effective.

"SEC. 553. SHARED ENERGY SAVINGS.—(a) The Secretary shall develop a simplified method of contracting for shared energy savings contract services that will accelerate the use of these contracts and will reduce the administrative effort and cost on the part of the government as well as the private customers.

"(b)(1) In carrying out subsection (a), the Secretary may:

"(A) request statements of qualifications, including financial and performance information, from firms engaged in providing shared energy savings contracting;

"(B) designate from the statements received, with an update at least annually, those firms that are presumptively qualified to provide shared energy savings services;

"(C) select at least three firms from the qualifying list to conduct discussions concerning a particular proposed project, including requesting a technical and price proposal from such selected firms for such project; and

"(D) select from such firms the most qualified firm to provide shared energy savings services pursuant to a contractual arrangement that the Secretary determines is fair and reasonable, taking into account the estimated value of the services to be rendered and the scope and nature of the project.

"(2) In carrying out subsection (a), the Secretary may also provide for the direct negotiation by departments, agencies, and instrumentalities, of contracts with shared energy savings contractors that have been selected competitively and

approved by any gas or electric utility serving the department, agency, or instrumentality concerned.

"SEC. 554. FEDERAL PRODUCT SCHEDULE.—Not later than two years after the date of enactment of the National Energy Security Act of 1991, the Administrator of the General Services Administration, in consultation with the Secretary, shall conduct an analysis of significant energy consuming products in the Federal Supply Schedule and develop and implement a method to identify those products which offer cost-effective opportunities to reduce energy consumption and costs. The Administrator shall also issue guidelines for users of the Federal Product Schedule to encourage the purchase of identified energy efficient models.

"SEC. 555. PURCHASE OF FEDERAL VEHICLES.—The Administrator of the General Services Administration, through the Automotive Commodity Center, in evaluating and accepting bids for the purchase of passenger vehicles and light trucks to meet specified requirements, shall consider the fuel efficiency of the passenger vehicles and light trucks offered in the bid, and the probable fuel and cost savings to the Federal government over the expected term of Federal use of such passenger vehicles and light trucks.

"SEC. 556. FEDERAL ENERGY EFFICIENCY PROJECTS FUNDING.—(a) IN GENERAL.—Not later than one year after the date of enactment of the National Energy Security Act of

1991, the Secretary shall establish guidelines for the transfer of up to $1 million per project to encourage any Federal agency to undertake energy efficiency projects in Federally owned facilities.

"(b) PROJECT SELECTION.—The Secretary shall establish procedures for the receipt of proposals under this section. The Secretary shall consider the following factors in determining whether to provide funding under subsection (a):

"(1) the cost effectiveness of the project;

"(2) the proportion of energy and cost savings anticipated to the Federal Government;

"(3) the amount of funding committed to the project by the agency requesting financial assistance;

"(4) the extent that a proposal leverages financing from other non-Federal sources; and

"(5) any other factor which the Secretary determines will result in the greatest amount of energy and cost savings to the Federal Government.

"(c) REPORTS.—The Secretary shall report annually to Congress, in the supporting documents accompanying the President's budget, on the activities under this section. The report shall include the projects funded and the projected energy and cost savings from installed measures.

"(d) AUTHORIZATION.—For purposes of this subsection, there is authorized to be appropriated, and to remain available until expended, not more than $50 million.".

SEC. 3102. PLAN REGARDING DEMONSTRATION OF NEW TECHNOLOGY.—(a) PLAN.—Within one year after the date of the enactment of this Act, the Secretary shall submit a plan to Congress for the demonstration in Federally owned facilities of energy efficiency and renewable energy technologies. The technologies shall be those technologies, as determined by the Secretary, that are ready for commercial demonstration. The Plan shall include:

(1) a listing of those technologies with specific candidate sites for the demonstration;

(2) the energy, environmental, cost savings or other expected benefits;

(3) a timetable for implementation; and

(4) a process for evaluation of the performance of the technologies.

(b) UPDATE.—The plan shall be updated every two years.

Subtitle C—Utilities

SEC. 3201. ENCOURAGEMENT OF INVESTMENTS IN CONSERVATION AND ENERGY EFFICIENCY RESOURCES AND STUDY OF CERTAIN STATE RATEMAKING POLICIES.—(a) AMENDMENT TO THE PUBLIC UTILITY REGULA-

TORY POLICIES ACT.—The Public Utility Regulatory Policies Act of 1978 (92 Stat. 3117), as amended, is further amended by inserting the following new paragraph at the end of section 111:

"(7) ENCOURAGEMENT OF INVESTMENTS IN CONSERVATION AND ENERGY EFFICIENCY RESOURCES.—

"(A) The rates allowed to be charged by a State regulated electric utility shall be such that the utility's investment in and expenditures for energy conservation, energy efficiency resources and other demand side management measures are as profitable as its investments in and expenditures for the construction of new generating facilities.

"(B) For purposes of implementing the provisions of this paragraph, any reference contained in this title to the date of enactment of the Public Utility Regulatory Policies Act of 1978 shall be deemed to be a reference to the date of enactment of the National Energy Security Act of 1991.".

(b) REPORT.—Not later than two years after the date of the enactment of this Act, the Secretary shall submit a report to the President and to the Congress containing—

(1) a survey of all State laws, regulations, practices, and policies under which State regulatory authorities require or permit rates charged by an electric utility to reflect least-cost planning;

(2) an evaluation by the Secretary of whether, and to what extent, least-cost planning is likely to result in:

(A) higher or lower electricity costs to an electric utility's ultimate consumers or to classes or groups of such consumers;

(B) enhanced or reduced reliability of electric service; and

(C) increased or decreased dependence on particular energy resources; and

(3) an evaluation by the Secretary of whether, and to what extent, ratemaking methodologies implementing least-cost planning adequately take into account the impact of such measures on electric utilities' costs, operations, and rate of return on investment.

(c) DEFINITION.—For purposes of subsection (b), the term "least-cost planning" means any standard, regulation, practice, or policy by which a State regulatory authority considers, or requires a State regulated electric utility to consider or implement, a plan for action (including, but not limited to, the construction of or purchase of electric energy from

new generation facilities and investment in or expenditures for conservation, energy efficiency resources, or other demand-side management measures) to be taken by a State regulated electric utility for purposes of providing adequate and reliable service to its electric customers with the incurrence of lowest costs by such utility and its customers.

SEC. 3202. CONSERVATION GRANTS TO STATE REGULATORY AUTHORITIES.—(a) CONSERVATION GRANTS.—The Secretary is authorized in accordance with the provisions of this section to provide grants to State regulatory authorities in an amount not to exceed $500,000 per authority, for purposes of encouraging the consideration of conservation, energy efficiency resources and other demand side management measures as a means of meeting electric supply needs.

(b) PLAN.—A State regulatory authority wishing to receive a grant under this section shall submit a plan to the Secretary that specifies the actions such authority proposes to take that would achieve the purposes of this section.

(c) SECRETARIAL ACTION.—In determining whether, and in what amount, to provide a grant to a State regulatory authority under this section the Secretary shall consider, in addition to other appropriate factors, the actions proposed by the State regulatory authority:

(1) to consider implementation of the ratemaking standard established in section 111(d)(7) of the Public Utility Regulatory Policies Act of 1978; and

(2) to achieve the purposes of this section.

(d) RECORDKEEPING.—Each State regulatory authority that receives a grant under this section shall keep such records as the Secretary shall require.

(e) RULES.—The Secretary may prescribe such rules as may be necessary or appropriate for carrying out the provisions of this section.

(f) DEFINITIONS.—For purposes of this section, the term "State regulatory authority" shall have the same meaning as defined in section 3 of the Public Utility Regulatory Policies Act of 1978.

(g) AUTHORIZATION.—There is authorized to be appropriated $5,000,000 for each of the fiscal years 1992, 1993, and 1994 to carry out the purpose of this section.

Subtitle D—Used Oil Energy Production

SEC. 3301. PURPOSE.—The purpose of this subtitle is to promote the refining, re-refining and reprocessing of used lubricating oil into fuels and other petroleum products.

SEC. 3302. REQUIREMENTS FOR ENERGY PRODUCTION FROM USED OIL.—Section 383 of the Energy Policy and Conservation Act (42 U.S.C. 6363) is amended—

(1) in subsection (c) by—

(A) striking "As soon as practicable after the date of enactment of this Act" and inserting "Not less than fifteen months after the date of enactment of the National Energy Security Act of 1991"; and

(B) striking "National Bureau of Standards" each place it appears and inserting "National Institute of Standards and Technology"; and

(2) by adding at the end thereof the following new subsection:

"(g) MARKET INCENTIVES FOR THE REUSE OF USED OIL.—

"(1) REQUIREMENTS.—(A) Beginning not later than eighteen months after the date of the enactment of the National Energy Security Act of 1991, a producer or importer of one hundred thousand gallons or more per year of lubricating oil shall each year either refine, re-refine, or reprocess into petroleum products, including fuels, using a method described in subparagraph (B), an amount of used oil equal to at least that amount of oil determined by—

"(i) multiplying the lubricating oil produced or imported that year by such person, by

"(ii) the percentage established by the Secretary under paragraph (2).

"(B) A producer or importer of lubricating oil may comply with this paragraph by—

"(i) refining, re-refining, or reprocessing used oil for purposes of producing petroleum products, including fuels; or

"(ii) purchasing credits under the credit system established pursuant to paragraph (3).

"(2) ESTABLISHMENT OF REUSE PERCENTAGE.—The Secretary shall establish, on an annual basis, a percentage for use under paragraph (1). The percentage applicable during the first year that the requirement established by paragraph (1) is in effect, shall be a percentage that is equal to the reuse rate for lubricating oil that exists on the date of the enactment of the National Energy Security Act of 1991. Such rate shall be determined by using data for the most recent year for which data are available. Through the year 2000, the percentage shall be an additional 2 percentage points higher than the actual percentage for the previous year as determined by the Secretary.

"(3) REGULATIONS.—"(A) IN GENERAL.—Not later than eighteen months after the date of the enactment of the National Energy Security Act of 1991, the

Secretary shall promulgate regulations to implement these requirements. These regulations shall cover:

"(i) producers or importers of lubricating oil;

"(ii) generators or collectors of used oil;

"(iii) a system, including permits, by which refiners, re-refiners and reprocessors of used oil may create credits which may be purchased by producers and importers of lubricating oil for the purpose of complying with subparagraph (1)(B);

"(iv) enforcement;

"(v) record-keeping;

"(vi) any other requirement which the Secretary considers necessary for administering the program set forth by this subsection; and

"(vii) prohibitions on the mixing of used oil with hazardous wastes or other physical or chemical impurities not associated with its use as a lubricating oil, and the creation of credits from such mixed used oil.

"(B) EXEMPTIONS.—

"(i) This subsection shall not apply to a facility:

"(I) that is classified as an S.I.C. number 2911 facility under the Office of Management and Budget Standard Classifi-

cation Manual and that refines used oil into fuel or other petroleum products, the amount of which is equal to no more than the amount of used oil that the owner of the facility is required to refine or otherwise reuse under paragraph (1)(A).

"(II) that is classified as an S.I.C. number 2899, or S.I.C. number 2992 facility under the Office of Management and Budget Standard Classification Manual and that compounds or blends lubricating base oil into finished lubricant products as its principal activity, provided that such facility has a contract to reprocess a customer's used lubricant, and does not take title to such lubricant, and such reprocessed lubricant product is returned to the customer.

"(ii) This subsection shall not apply to used oil that is generated on-site for on-site energy production activities, including storage, use, and transportation, carried out at a facility that is classified as an S.I.C. number 4911 facility under the Office of Management and Budget Standard Classification Manual.

"(iii) The Secretary shall promulgate regulations establishing requirements for exempt refineries that refine used oil. The regulations shall cover recordkeeping, testing, and such other matters as the Secretary determines are necessary and appropriate for refining used oil at exempt refineries.

"(4) DEFINITIONS.—For purposes of this subsection, the term—

"(A) 'credit' means a legal record of used oil refined, re-refined or reprocessed in accordance with this subsection for purposes of complying with paragraph (1);

"(B) 'producer' with respect to lubricating oil means any person who produces a lubricant base stock from crude oil. Such production does not include the re-refining of used oil;

"(C) 'importer' with respect to lubricating oil means any person who imports a lubricant base stock or lubricating oil, except for lubricating oil contained in transportation vehicles or other machinery;

"(D) 'lubricant base stock' means oil from which lubricating oil is made after introduction of additives;

"(E) 'generator' and 'collector' mean any person who collects, stores, accumulates, or otherwise generates used oil. Such terms do not include an individual who generates used oil by removing such oil from the engine of a light duty motor vehicle or household appliance owned by that individual;

"(F) 're-refiner' and 'reprocesser' mean any person who produces lubricating oils, fuels, or other petroleum products through the processing of used oil; and

"(G) 'refiner' means any owner or operator of a facility that is classified as an S.I.C. 2911 facility under the Office of Management and Budget Standard Classification Manual.

"(5) AUTHORIZATIONS.—(A) There is authorized to be appropriated to the Secretary of Energy $2,000,000 to carry out this subsection.

"(B) There is authorized to be appropriated to the Secretary of Commerce for use by the National Institute of Standards and Technology $3,000,000 to carry out its responsibilities under this section.

"(6) REPORT.—One year after the date of enactment of this subsection, and annually thereafter, the Secretary shall submit a report to the House of Repre-

sentatives and the Committee on Energy and Natural Resources of the Senate on the implementation and operation of this subsection.".

SEC. 3303. LISTING OR IDENTIFICATION OF USED OIL.—Section 3001 of the Solid Waste Disposal Act is amended by adding at the end the following:

"(j) USED OIL.—Notwithstanding this Act or any other provision of law, the Administrator shall not list or identify used oil as a hazardous waste under this subtitle, nor shall used oil otherwise be deemed to be a hazardous waste under this subtitle.".

SEC. 3304. SUNSET PROVISION.—The provisions of this subtitle expire five years after the date of enactment of this Act.

Subtitle E—Insular Areas Energy Assistance

SEC. 3401. INSULAR AREAS ENERGY ASSISTANCE PROGRAM.—(a) FINANCIAL ASSISTANCE.—(1) The Secretary, pursuant to the Federal Nonnuclear Energy Research and Development Policy Act of 1974 (42 U.S.C. 5901–5901), may grant financial assistance to Insular area governments to carry out projects to evaluate the feasibility of, develop options for, and encourage the adoption of energy efficiency and renewable energy measures which reduce the dependency of the Insular area on imported fuels and promote development in the Insular area.

(2) Any applicant for financial assistance under this section must evidence coordination and cooperation with, and support from, the affected local energy institutions.

(3) In determining the amount of financial assistance to be provided for a proposed project, the Secretary shall consider—

(A) whether the measure will reduce the relative dependence of the Insular area on imported fuels;

(B) the ease and costs of operation and maintenance of any facilities contemplated as a part of the project;

(C) whether the project will rely on the use of conservation measures or indigenous, renewable energy resources that were identified in the 1982 Territorial Energy Assessment or are identified by the Secretary as consistent with the purpose of this section;

(D) whether the measure will contribute significantly to development or the quality of the environment in the Insular area; and

(E) any other factors which the Secretary may determine to be relevant to a particular project.

(4) The Secretary shall require at least 20 per centum of the costs of any project under this section to be provided from non-Federal sources. Such cost sharing may be in the form of

inkind services, donated equipment, or any combination thereof.

(b) DEFINITIONS.—For the purpose of this section, the term—

(1) "Insular area government" means American Samoa government, Commonwealth of the Northern Mariana Islands, Commonwealth of Puerto Rico, Federated States of Micronesia, Government of Guam, Republic of the Marshall Islands, Republic of Palau, and United States Virgin Islands; and

(2) "1982 Territorial Energy Assessment" means the assessment prepared by the Department of Energy pursuant to the Omnibus Territorial Act. (Public Law 96–597, 94 Stat. 3480; as amended by Public Law 99–213, 97 Stat. 1460).

(c) AUTHORIZATION.—There is hereby authorized to be appropriated for each fiscal year $500,000 to carry out the purposes of this section.

TITLE IV—RENEWABLE ENERGY

Subtitle A—CORECT

SEC. 4001. DUTIES OF CORECT.—Section 256 of title II, part B, of the Energy Policy and Conservation Act is amended by striking subsection (d) and inserting the following in lieu thereof:

"(d)(1) DUTIES.—There shall be established an interagency working group (hereafter in this subsection referred to as the Committee on Renewable Energy Commerce and Trade (CORECT)) which, in consultation with the representative industry groups and relevant agency heads, shall make recommendations to coordinate the actions and programs of the Federal Government to promote the export of United States renewable energy and energy efficiency products and technologies. The Secretary of Energy shall be the Chairman of such group. The heads of appropriate agencies may detail such personnel and may furnish such services to such working group, with or without reimbursement, as may be necessary to carry out its functions.

"(2) ADDITIONAL DUTIES.—CORECT shall promote the development and application in lesser-developed countries of renewable energy and energy efficiency resource technologies that—

"(A) promote more efficient use of fossil fuels;

"(B) reduce dependence on the importation of fossil fuels by encouraging the use of sustainable biomass, wind power, hydropower, solar, geothermal and other renewable energy and energy efficiency resource technologies;

"(C) foster rural and urban energy development and energy self-sufficiency through the use of reliable

and economical renewable energy and energy efficiency resource technologies;

"(D) explore mechanisms for assisting in the domestic manufacture, particularly by small business manufacturers, of energy efficiency and renewable energy resource technologies, for export; and

"(E) increase staffing to support the new authority and responsibilities described in this section.

"(3) TRAINING AND ASSISTANCE.—In furthering the purposes of this section, CORECT shall—

"(A) provide aggressive in-country technical training for local users and international development personnel;

"(B) provide financial assistance to support nonprofit institutions designed solely and specifically to support the efforts of domestic renewable energy and energy conservation companies to market their products, and to develop environmentally responsible projects in developing nations;

"(C) establish feasibility and loan guarantee programs to facilitate access to capital and credit; and

"(D) support, through financial incentives, private sector efforts to commercialize and export renewable energy and energy efficiency resource technologies.

"(4) OUTREACH.—CORECT may establish renewable energy industry outreach offices in the Pacific Rim and in the Caribbean Basin for the purpose of providing information concerning renewable energy and energy efficiency technologies and industries of the United States to governments, industries, and others outside of the continental United States.".

SEC. 4002. INFORMATION AND TECHNICAL PROGRAM.—Section 256(c)(2)(D) title II part B of the Energy Policy and Conservation Act is amended by striking clause (ii) and inserting in lieu thereof the following new clause:

"(ii) information on the specific energy technology needs of lesser-developed countries, the technical and economic competitiveness of various renewable energy and energy efficiency resource technologies, and the status of ongoing technology assistance programs shall be provided. Information from this program shall be made available to industry, Federal and multilateral lending agencies, nongovernmental organizations, host-country and donor-agency officials, and such others as the Secretary deems necessary.".

SEC. 4003. COMPREHENSIVE ENERGY TECHNOLOGY EVALUATION.— Section 256 of title II, part B, of the Energy Policy and Conservation Act is amended by adding at the end new subsections (e) and (f) as follows:

"(e)(1) Not later than June 1, 1991, and biennially thereafter, the Secretary shall prepare and submit to Congress a report evaluating the range of energy efficiency and renewable energy technologies available to meet the energy needs of developing countries. This report also shall provide information on the specific energy needs of lesser-developed countries, an inventory of United States technologies and services to meet those needs, and an update on the status of ongoing bilateral and multilateral technology assistance and renewable energy resource programs.

"(2) The report also should include an evaluation of current programs, their priority in meeting program objectives, and recommendations for future programs that—

"(A) develop and promote sustainable use of indigenous renewable energy resources in lesser-developed countries;

"(B) given the credit and capital restrictions in lesser-developed countries, focus on technologies that are both appropriate and economically viable;

"(C) meet the needs of lesser-developed countries for energy rather than creating new needs, in order to ensure immediate income-generating use of the power generated;

"(D) work with local individuals to assure that programs and projects meet specific national and local needs;

"(E) use indigenous materials and associated hardware, wherever possible, in order to reduce costs and ensure project duplication;

"(F) provide examples of cost-effective systems and applications for in-country non-governmental organizations and project technical personnel;

"(G) provide mechanisms for assisting United States manufacturers, particularly smaller manufacturers, of energy-efficiency and renewable energy technologies, in exporting their goods and services;

"(H) expand technical and administrative training programs, as well as distribution of multilingual technical training manuals and related materials; and

"(I) examine the potential for using economic incentives to promote technology transfer, such as shared savings contracts, loan guarantees, and tax incentives, to lesser developed countries.

"(f) AUTHORIZATIONS.—(1) There is authorized to be appropriated for purposes of carrying out the programs under sections (d) and (e) $10,000,000 for fiscal year 1992, including $2,000,000 to carry out the purposes of subparagraph (d)(2), and such sums as may be necessary for fiscal year

1993 and 1994 to carry out the purposes of this subtitle except for subparagraph (d)(4).

"(2) There is authorized to be appropriated for the purposes of subparagraph 256(d)(4), in addition to the amount specified in the previous sentence, $2,750,000 for fiscal year 1992, and such sums as may be necessary for fiscal years 1993 and 1994.".

Subtitle B—Renewable Energy Initiatives

SEC. 4101. JOINT VENTURES FOR RENEWABLE ENERGY DEVELOPMENT FOR OIL DISPLACEMENT AND TECHNOLOGY EXPORT TRAINING.—(a) Section 6 of the Renewable Energy and Energy Efficiency Technology Competitiveness Act of 1989 (Public Law 101–218) is amended by adding new subsections (f) and (g) as follows:

"(f) ADDITIONAL JOINT VENTURES FOR RENEWABLE ENERGY DEVELOPMENT FOR OIL DISPLACEMENT.—

"(1) OIL DISPLACEMENT BY BIOFUELS ENERGY SYSTEMS.—

"(A) The Secretary shall solicit proposals for and provide financial assistance to at least one joint venture for the commercialization of biofuels energy systems technology in accordance with the provisions of this paragraph.

"(B) The purpose of joint ventures supported under this paragraph shall be to design, test and

demonstrate critical enabling technologies for the development of biofuels energy systems for commercial application in uses that have substantial prospects for displacing the consumption of oil.

"(C) There is authorized to be appropriated to the Secretary not to exceed $3,000,000 for each of the fiscal years 1992, 1993 and 1994 to carry out the purposes of this paragraph.

"(2) OIL DISPLACEMENT BY GEOTHERMAL ENERGY.—

"(A) The Secretary shall solicit proposals for and provide financial assistance to at least one joint venture for the commercialization of geothermal energy conversion technology in accordance with the provisions of this paragraph.

"(B) The purpose of joint ventures supported under this paragraph shall be to design, test and demonstrate critical enabling technologies for the production of geothermal energy for commercial application in uses that have substantial prospects for displacing the consumption of oil.

"(C) There is authorized to be appropriated to the Secretary not to exceed $3,000,000 for each of the fiscal years 1992, 1993, and 1994 to carry out the purposes of this paragraph.

"(3) OIL DISPLACEMENT BY SOLAR WATER HEATING.—

"(A) The Secretary shall solicit proposals for and provide financial assistance to at least one joint venture for the commercialization of solar water heating technology in accordance with the provisions of this paragraph.

"(B) The purpose of joint ventures supported under this paragraph shall be to design, test and demonstrate critical enabling technologies for solar water heating for commercial application in institutional water heating and process heat uses that have substantial prospects for displacing the consumption of oil.

"(C) There is authorized to be appropriated to the Secretary not to exceed $3,000,000 for each of the fiscal years 1992, 1993, and 1994 to carry out the purposes of this paragraph.

"(4) DIESEL FUEL OIL DISPLACEMENT BY PHOTOVOLTAIC AND WIND ENERGY SYSTEMS.—

"(A) The Secretary shall solicit proposals for and provide financial assistance to at least one joint venture for the commercialization of photovoltaic and wind energy systems in accordance with the provisions of this paragraph.

"(B) The purpose of joint ventures supported under this paragraph shall be to design, test and demonstrate critical enabling technologies for photovoltaic and wind energy systems for commercial application in electric power generation uses that have substantial prospects for displacing the consumption of diesel fuel oil.

"(C) There is authorized to be appropriated to the Secretary not to exceed $3,000,000 for each of the fiscal years 1992, 1993, and 1994 to carry out the purposes of this paragraph.

"(5) DIESEL FUEL OIL DISPLACEMENT BY DIRECT COMBUSTION OR GASIFICATION OF BIOMASS.—

"(A) The Secretary shall solicit proposals for and provide financial assistance to at least one joint venture for the commercialization of technologies for the direct combustion or gasification of biomass in accordance with the provisions of this paragraph.

"(B) The purpose of joint ventures supported under this paragraph shall be to design, test and demonstrate critical enabling technologies for direct combustion or gasification of biomass, including waste wood, for industrial process heat

and electric power generation for commercial application in uses that have substantial prospects for displacing the consumption of diesel fuel oil.

"(C) There is authorized to be appropriated to the Secretary not to exceed $3,000,000 for each of the fiscal years 1992, 1993, and 1994 to carry out the purposes of this paragraph.

"(6) OIL DISPLACEMENT BY FUEL CELLS TECHNOLOGY.—

"(A) The Secretary shall solicit proposals for and provide financial assistance to at least one joint venture for the demonstration of fuel cells technology in accordance with the provisions of this paragraph.

"(B) The purpose of joint ventures supported under this paragraph shall be to design, test, and demonstrate critical enabling technologies for the production of electric energy from fuel cells in order to accelerate commercial application of fuel cells.

"(C) There is authorized to be appropriated to the Secretary not to exceed $3,000,000 for each of the fiscal years 1992, 1993, and 1994 to carry out the purposes of this paragraph.

"(g) RENEWABLE ENERGY AND ENERGY EFFICIENCY TECHNOLOGY EXPORT TRAINING.—(1) The Secretary shall solicit proposals for and provide financial assistance to at least two joint ventures for the training of individuals from developing countries at a location or locations in the United States, at least one of which shall be in the operation and maintenance of renewable energy equipment and one of which shall be in the operation and maintenance of energy efficiency equipment, in accordance with the provisions of this paragraph.

"(2) The purpose of joint ventures supported under this paragraph shall be to train individuals, including engineers and other professionals, in the operation and maintenance of renewable energy and energy efficiency equipment manufactured in the United States, including equipment for water pumping and the production of electric power in remote areas, in order to enhance the prospects that such equipment can be used to displace the use of diesel fuel oil in developing countries.

"(3) There is authorized to be appropriated to the Secretary not to exceed $6,000,000 for each of the fiscal years 1992, 1993, and 1994 to carry out the purposes of this paragraph.".

(b) CONFORMING AMENDMENTS.—(1) The first sentence of paragraph (b)(1) of such section is amended to re-

place the phrase "subsection (c)" with the phrase "subsections (c), (f) and (g)".

(2) Paragraph (b)(4) of such section is amended to read as follows—

"(4) DRAFT SOLICITATIONS AND PUBLIC COMMENT.—The Secretary shall issue a draft solicitation for joint ventures under subsection (c) by September 30, 1990 and a draft solicitation for joint ventures under subsections (f) and (g) by September 30, 1991. After any such draft solicitation has been issued, the Secretary shall provide for a period of public comment before the issuance of a final solicitation.".

(3) Subsection (d) of such section is amended to replace the phrase "subsection (c)" everywhere it appears by "subsections (c) or (f)".

SEC. 4102. REPORT ON WASTE MINIMIZATION TECHNOLOGIES IN INDUSTRY. (a) REPORT.—Within one year after the date of enactment of this Act, the Secretary shall provide to the Committee on Energy and Natural Resources of the United States Senate and to the United States House of Representatives a report evaluating opportunities to minimize waste outputs from production processes in industries in the United States.

(b) CONTENTS.—The report required by this section shall include—

(1) an assessment of the technologies available to increase productivity and simultaneously reduce the consumption of energy and material resources and the production of wastes;

(2) an assessment of the current use of such technologies by industry in the United States;

(3) the status of any such technologies currently being developed, together with projected time-frames for their commercial availability;

(4) the energy savings resulting from the use of such technologies;

(5) the environmental benefits of such technologies;

(6) the costs of such technologies;

(7) an evaluation of any existing federal or state regulatory disincentives for the employment of such technologies; and

(8) an evaluation of any other barriers to the use of such technologies.

(c) CONSULTATION.—In preparing the report required by this section, the Secretary shall consult with the Administrator of the Environmental Protection Agency, any other Federal, State, or local official the Secretary deems necessary, representatives of appropriate industries, members of organizations formed to further the goals of environmental

protection or energy efficiency, and other appropriate interested members of the public, as determined by the Secretary.

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PREPARED STATEMENT OF HON. JEFF BINGAMAN, U.S. SENATOR FROM NEW MEXICO

I want to thank the chairman for his leadership in turning this Committee's attention to the important issue of a national energy policy. Today's hearing deals with what I view as two of the most critical elements of a national energy policy—energy efficiency and renewable energy technologies.

I share the concern of the members of this committee that the Administration's National Energy Strategy does not meet the goals which we must set for ourselves, namely to be more energy self-sufficient and to reduce our reliance on foreign sources of energy. I will be introducing legislation later this week outlining what those goals should be. I hope today's hearing and the testimony of our witnesses will point out how short-sighted we are if do not take advantage of energy efficiency strategies and renew our commitment to developing and promoting renewable energy sources. These are the two simplest ways to meet our energy security goals.

Making renewable energy sources economically viable as quickly as possible will be critical to the success of a national energy policy and ultimately for achieving energy security. The state of New Mexico has and will continue to play an important role in the areas of solar, geothermal, hydrogen and wind. The potential market for renewable energy technologies goes well beyond our own borders and will continue to grow as nations respond to the concerns over our environment. I would like to see our industries could regain the lead, both in R&D and commercialization of these technologies.

In order to achieve the kind of energy security this country needs while preserving the environment, we cannot afford to pursue "business-as-usual". We need to think in new terms. As an example, I would like to cite an important effort which is underway in New Mexico and which should serve as a model for efforts throughout the country. I refer to the program being carried out by Sandia and Los Alamos National Laboratories in cooperation with universities and industry which is known as Environmentally Conscious Manufacturing or ECM. ECM is a new approach to manufacturing which considers the manufacturing process from beginning to end and seeks to maximize energy efficiency and minimize waste, especially hazardous waste. The approach addresses three key issues in the overall energy problem—better utilization of energy, minimizing negative impacts on the environment, and an important third issue—economic competitiveness. I would like to see more effort devoted to establishing similar programs in other parts of the country.

I look forward to the testimony of the witnesses today as they address these important issues. I am particularly pleased that Mike Davis is here to testify. Mike participated in a hearing my Subcommittee held in New Mexico in November and he is well aware of the contributions New Mexico is making to our nation's energy future. I know he is personally committed to seeing renewable energy play an enhanced role in meeting our energy needs.

STATEMENT OF HON. MALCOLM WALLOP, U.S. SENATOR FROM WYOMING

Senator WALLOP. Thank you, Mr. Chairman. And again, it is nice to be under way on this series of hearings. As you have pointed out, we have achieved some significant advances in our efficient use of energy. I have a statement which I would wish to have inserted in the record in its entirety, but I would like to make a couple of observations.

One is that energy efficiency does not imply the denial of access to energy. And it does not imply less power, but it does imply the more efficient use of the power that we have. Conservation does not mandate diminished access to energy, but its more efficient use. I believe it is fair to state that further improvements can be made in the efficient use of available energy supplies. But these improvements must be price driven if they are to become permanent.

Regulatory interventions into the market often imposes unforeseen cost by reducing the flexibility of the economy—in sort of put little hernias on the whole energy system—because it drives people to certain decisions soley on the basis of the Government interven-

tion. So it seems essential to me that Government initiatives ought to rely upon economic incentives and be based upon rigorous kind of cost-benefit analysis.

If we are going to be effective in promoting the more efficient use of energy, then these initiatives must rely in large measure on market forces. And that is particularly true if integrated resource planning is to be effective in promoting energy efficiency and renewable energy technologies. Fundamental to the success of any national energy strategy, and fundamental to the purpose behind ours, is that it be sufficiently flexible so all domestic energy supply and demand alternatives can compete. Frankly, the current energy situation provides an opportunity to promote competitive market oriented policies that rely upon the strengthening of our energy industry.

The administration has estimated that energy demand and supply initiatives can achieve comparable benefits under a balanced national energy strategy. We have estimated the same. By the year 2000, oil consumption can be reduced by 1.3 million barrels and domestic production can be increased by 1.8 million barrels a day. And incidentally, that does not necessarily only mean oil; it means energy and its BTU equivalent.

From this perspective, it is just not enough to foster energy efficiency in the use only of renewable energy resources. We must also develop a policy which takes all reasonable steps to promote energy: production of oil, natural gas, hydro, coal, nuclear power, and alternative fuels, and so on.

It seems to me, Mr. Chairman, that we need to revive the idea of national interest. Our energy problems exist in large measure not because we have a shortage of resources, but because we have failed to make those resources available to the American people. We have failed to make nuclear power available to them. We have failed to make a lot of things available because our regulatory system denies access to alternative resources to the marketplace. We have failed to make it possible because we have denied the America people the ingenuity of their technological system.

And it has not been because of a lack of resource, but because of a lack of research and a lack of access that we find ourselves in the position we are today. Research can give us the efficiency and research can give us access to the energy we already have an abundance of.

[The prepared statement of Senator Wallop follows:]

PREPARED STATEMENT OF HON. MALCOLM WALLOP, U.S. SENATOR FROM WYOMING

Mr. Chairman, one of the most important tasks facing the 102nd Congress is to lay a foundation for a more efficient, less vulnerable and sustainable energy future for all Americans. I am reminded of the July 1989 words of President Bush when he advocated "achieving balance among our increasing needs for energy at reasonable prices, our commitment to a safer, healthier environment, our determination to maintain an economy second to none, and our goal to reduce dependence by ourselves and our friends and allies on potentially unreliable energy supplies."

By blending the legislation before us with the Administration's recommendations for a national energy strategy, we can achieve this objective. We can set a course toward greater energy self-sufficiency by fostering both domestic energy production and the efficient use of all available energy supplies. Today's hearing focuses on initiatives to foster commercialization and greater use of renewable energy and energy

efficiency alternatives throughout our economy. Among these initiatives are programs to:

Foster Federal leadership in the areas of buildings owned and operated by the Federal government;

Foster Federal leadership in the purchase of vehicles that are either more efficient or utilize alternative fuels; and

Encourage State regulatory commissions to consider demand side initiatives in areas of energy efficiency and renewable energy.

There is general agreement that such renewable energy and energy efficiency initiatives are prudent and should be included in a national energy strategy. But we must not delude ourselves into thinking that these initiatives alone are an adequate response to existing threats to the economic health and energy security of our nation.

There are those who suggest that the solution to our nation's energy crisis is simply to do more with less. This simplistic view of the world does not recognize that we are already doing so: energy consumption per unit of Cross National Product is down twenty-eight percent since 1973, and the miles-per-gallon of our cars is up by more than fifty-four percent. This current trend will achieve a further decrease of 12 percent in energy per unit of gross national product in the year 2000 and more than 20 percent in the year 2010 over today.

Further improvements can be made in our efficient use of available energy supplies, but such improvements must be price driven if they are to become permanent. Regulatory interventions into the marketplace can impose unforeseen costs by reducing the flexibility of our economy and in the long-term reduce our options. Therefore, it is essential that such government initiatives rely on economic incentives and be based on rigorous cost-benefit analyses. If we are to be effective in promoting the more efficient use of energy, then our initiatives must rely on market forces. This is particularly true if integrated resource planning is to be effective in promoting energy efficiency and renewable energy technologies.

Fundamental to the success of any national energy strategy is that it be sufficiently flexible for all domestic energy supply and demand alternatives to compete in the market place. Frankly, the current energy situation provides an opportunity to promote competitive, market-oriented energy policies that rely on the strengths of our energy industry.

The Administration has estimated that energy demand and supply initiatives can achieve comparable benefits under a balanced national energy strategy. By the year 2000, oil consumption can be reduced by 1.3 million barrels per day and domestic oil production can be increased by 1.8 million barrels per day. By the year 2010, oil consumption can be reduced by 3.4 million barrels per day and domestic oil production can be increased by 3.8 million barrels per day.

From this perspective, it is not enough to foster energy efficiency and the use of renewable energy resources. We also must develop an energy policy which takes all reasonable steps to promote domestic energy production—oil, natural gas, hydro, coal, nuclear power, alternative fuels and so on.

We need to revive the idea of "National Interest". Our energy problems exist not because we have a shortage of resources, but because we have failed to make those resources available to the American people.

The CHAIRMAN. Thank you very much, Senator Wallop.

Gentlemen of the committee, we can have opening statements by all, but I would like to, if we could, go to the witnesses. I will bend to the wishes of the committee, however, if you would like to offer opening statements. The reason I say that is we have got some 15 hearings and 15 different titles.

Senator Wirth, you have been a leader in that area.

Senator WIRTH. I had wanted to hear from Senator Burns, but if he would defer, we can go ahead with the witness.

[Laughter.]

The CHAIRMAN. Thank you very much for your forbearance, gentlemen. I appreciate that.

Our first witness this morning is Mr. Mike Davis, who is Assistant Secretary for Conservation and Renewable Energy. Mr. Davis, welcome to the committee. Please proceed. I would tell all witnesses that your statements will put in the record as if read in full,

so you may summarize so we can get to questions, or proceed as you wish.

STATEMENT OF J. MICHAEL DAVIS, ASSISTANT SECRETARY, CONSERVATION AND RENEWABLE ENERGY, DEPARTMENT OF ENERGY

Mr. DAVIS. Thank you, Mr. Chairman, and good morning. And good morning to members of the committee. I will summarize my statement with your approval.

I look forward to presenting the Department of Energy's view on titles III and IV of S. 341. I would like to say from the outset, particularly with respect to technology development activities, there are a number of provisions contained in the National Energy Strategy which are outside the provisions of this bill, and which are extremely important to the overall success of the strategy. We do not need to go into them in detail here because a lot of those are dealt with in Appropriations. But some members of this committee are certainly going to have a role in the appropriations process as well.

With respect to specific provisions of S. 341, starting with section 3001 the National Energy Strategy actually goes beyond the provisions of this section by applying Federal energy efficiency standards to all Federally assisted buildings including housing financed with federally guaranteed mortgage loans, through the Federal Housing Administration, as well as Veterans Administration and Farmers Home Administration.

This section also authorizes the Secretary to provide financial assistance to the States and local governments. We think this is an important provision as well, but we want to be sure that the language is clear. We would like to see technical support, but we would not like to actually support construction. We think there are a number of activities we can do to facilitate the adoption of better codes without actually using money to support construction projects.

With respect to Section 3002, Residential Energy Efficiency Ratings, we believe that we are actually under way with this provision. We are already working with HUD, the States, and others to initiate a collaborative process for home energy rating systems, including both guidelines and procedures. However, legislation would build support for this effort.

Section 3003, Improving Energy Efficiency in Energy-Intensive Industries, would require the Secretary to support at least five joint ventures to improve energy efficiency on productivity through changes in industrial processes in energy-intensive industries. This may be an appropriate extension of the R&D program in waste minimization and process efficiency carried out by the Office of Industrial Technologies. We would like these joint ventures to be contingent on the availability of appropriations.

Further, specifying in statute the number and types of such joint ventures is undesirable, as it may not provide the flexibility needed to respond to industry interests.

Additionally, we would not support displacing our ongoing program of efficiency R&D on industrial technologies to accommodate this initiative.

Section 3004. The report provisions might more appropriately be included in the biennial report to Congress on the national energy policy and not tied to a specific projection built on unstated economic and technical assumptions. A more appropriate baseline might be current consumption with a consistent 10-year horizon.

Section 3005, Voluntary Guidelines for Industrial Plants, is consistent with the National Energy Strategy's intent to encourage private sector industrial audits, but we believe it inappropriately emphasizes insulation, which is only one of many energy efficiency measures that should be considered in an industrial facility. Insulation measures typically represent about 5 percent of the package recommended for medium-sized industrial facilities through our ongoing energy audit programs. There is ample reason to believe that industry will save energy when it will be cost effective.

We recommend instead expanding support for our existing audit program which also helps to develop the human resources through the education of engineering students.

Section 3006, Energy Efficiency Labeling for Windows and Window Systems. The Department supports these provisions.

Section 3007, Energy Efficiency Information. We support this direction, but we would suggest that efforts done are in this area be coordinated with the States and also with the Environmental Protection Agency to ensure that the data are consistent by end-use category.

Section 3008, Energy Efficiency Labeling for Lamps and Luminaries. We also support these provisions.

Section 3009, Commercial and Industrial Equipment Efficiency Standards, would extend the Department's existing authority to require testing and labeling for certain industrial and commercial equipment, and would require the Secretary to determine whether to set performance standards for electric lights, utility distribution transformers, and electric motors and pumps. The administration opposes any provisions requiring the Secretary to set performance standards for products such as motors. However, such standards are not required by this language.

Testing and labeling activities are consistent with the National Energy Strategy, which also recommends that office equipment, which is the fastest growing use of electricity in the commercial sector, be included among those items authorized for testing and labeling.

Finally, if utility distribution transformers are added to the list, we would recommend also including high-voltage transformers on customer premises, which can be another significant source of energy use.

For all these products, the responsibility of labeling rules should be assigned to the Federal Trade Commission as in previous sections.

Subtitle B, Federal Energy Management. The Department favors provisions that would cost-effectively strengthen the existing Federal Energy Management Program as outlined in the National Energy Strategy and under a proposed Executive Order. However, we cannot support some of the specific points of the subtitle as drafted. For example, the bill gives the Secretary, instead of appropriate agency heads, the responsibility to select contractors for

energy efficiency improvements under the simplified process for shared savings contracts. We think that responsibility should reside with the head of the particular agency.

Additionally, with regard to the $50 million authorization contained in the proposed section 556, it is not clear that this would be the optimal funding mechanism for Federal energy efficiency projects. We would like to work, as we would on all of these measures, further with the committee to look at the possibilities of other funding sources for these kinds of activities.

Subtitle C, Utilities, would require public utility commissions to consider adopting ratemaking standards for utility investments in energy efficiency and other demand-side management measures which would be as profitable as investments in generation. We certainly agree. We applaud the intent of this provision which is consistent with NES support of integrated resource planning, but we do believe it goes too far and intrudes inappropriately upon the prerogative of the States. The States are way out ahead on this activity, and we would like to find ways to support them.

Subtitle D, Used Oil Energy Production. We also would like to discuss that further with the committee. Our information shows that more that 60 percent of used oil is currently recycled.

Subtitle E, Insular Energy Assistance, would authorize the Secretary to provide financial assistance to insular area governments to encourage the adoption of energy efficiency and renewable energy measures. We support this provision.

Turning now to some topics in Title IV, Renewable Energy.

Subtitle A, CORECT. The Department supports this provision. However, the language contained in proposed section 256(D) requiring CORECT to establish feasibility and loan guarantee programs to facilitate access to capital and credit, we believe goes too far. CORECT's chief function is to serve as an interagency coordinating committee and such programs should be the responsibility of one or more of the member agencies, not CORECT. The word "encourage" should be substituted for "establish."

Also, the report required by section 4003 will require considerable data, both foreign and domestic and we do not think it could be produced by June 1st of 1991. We would prefer an 18-month deadline from date of enactment.

Subtitle B, Renewable Energy Initiatives, would expand the number of joint ventures required under Public Law 101-218. The Department supports expanding joint venture activities, but we would propose that they be made contingent upon availability of appropriations specifically for this purpose.

Section 4102, Report on Waste Minimization Technologies in Industry, is consistent with the R&D program in waste minimization. We have no objection to this requirement. However, to stay within the time line contained in the bill, we suggest that it be limited to major processes within certain highly energy-intensive industries, for example, chemicals, paper, and steel, and that $1 million be authorized per industry.

In general, Mr. Chairman, titles III and IV of S. 341 are consistent with the direction of the National Energy Strategy and would make important contributions to development and wider use of renewable energy and energy efficiency technologies.

We look forward to working with the committee further to refine the few points where we think we can improve the bill.

I would be happy to entertain any questions.

[The prepared statement of Mr. Davis follows:]

PREPARED STATEMENT OF J. MICHAEL DAVIS, ASSISTANT SECRETARY, CONSERVATION AND RENEWABLE ENERGY, DEPARTMENT OF ENERGY

Mr. Chairman and members of the Committee, I am pleased to have the opportunity to present the Department of Energy's views on S. 341, the National Energy Security Act of 1991, with particular reference to Titles III and IV, concerning energy efficiency and renewable energy.

As the National Energy Strategy observes, greater energy efficiency can reduce energy costs to consumers, enhance environmental quality, maintain and enhance our standard of living, increase our freedom and energy security, and promote a strong economy.

In residential and commercial buildings, the National Energy Strategy seeks to maintain or enhance comfort, indoor air quality, and affordability while reducing energy use. In the industrial sector, it seeks to improve energy efficiency and flexibility, thereby reducing petroleum use and overall production costs. Finally, in the transportation sector, it seeks to reduce our dependence on imported oil by encouraging the use of alternative fuels, by improving the efficiency of all the vehicles on the road, and by increasing the overall efficiency of the transportation system itself.

With regard to renewable energy, public comment received during development of the National Energy Strategy revealed virtually unanimous support for the development and use of renewable energy resources because of their environmental and energy security advantages. As a result of this overwhelming interest and support, extensive analytical efforts were made to better understand the potential of each renewable energy resource and the barriers—technological, marketplace, or otherwise—that might block renewable energy resources from achieving their full potential.

This analysis led to several important conclusions. First of all, renewables can play a larger role in our energy economy. The fraction of our energy supplied by renewables has been increasing, and that increase is projected to continue. Second, we can accelerate the growth in renewable supplies over the next 40 years without resorting to permanent subsidies or mandates. This is because several renewable technologies are on the verge of successful commercialization into the mainstream energy marketplace. These technologies have experienced significant technical progress over the past 10 years. Further cost reductions and performance improvements require no scientific breakthroughs, but rather a succession of research, engineering, and manufacturing improvements that are well within reach of U.S. industry. What is needed is a stable investment climate, the opportunity to reduce R&D progress to practice, removal of market barriers to renewables, and continued, focused R&D to realize the full potential of these technologies.

Adding renewable technologies to the menu of available energy choices can contribute to a growing economy—domestically, by spurring competition and innovation, and internationally, by providing new products and technologies for export and contributing to the balance of trade. Renewable technologies represent an important opportunity for the U.S. energy economy. Their long-term contribution is predicated on overcoming remaining technical and cost barriers, mainly through intensified R&D. As we succeed with renewable technologies in the U.S., we will enable the rest of the world to benefit from energy that is not subject to boundaries or control by others.

In that context, let me turn now to the specific provisions of Titles III and IV of S. 341.

Sec. 3001, Building Energy Efficiency Standards, would extend the application of Federal building standards to public and assisted housing and to residential housing (other than manufactured homes) subject to mortgages under the National Housing Act. This is consistent with the National Energy Strategy's intent to strengthen the energy efficiency standards for all Federally assisted new housing, including housing financed with Federally guaranteed mortgage loans (Federal Housing Administration, Veterans Administration, and Farmers Home Administration).

The section also authorizes the Secretary of Energy to provide financial assistance to the States and local governments which intend to conform their building codes to the Federal standards, to assist them in furthering the design and construction of energy-efficient commercial buildings. This is generally consistent with the National

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Energy Strategy's intent to make Federal technical and financial assistance available to help State and local governments, as well as industry and building-code organizations, update their energy efficiency code provisions and ensure cost-effective compliance but should not be aimed at supporting private-sector construction projects.

Section 3002, Residential Energy Efficiency Ratings, would direct the Secretary to issue guidelines, for implementation by the States, for assigning energy efficiency ratings to residential buildings. This is consistent with the National Energy Strategy's intent that the Department of Energy, in cooperation with States, utilities, and real estate and lending institutions, develop and disseminate reliable techniques for rating the energy performance of both new and existing homes. The Strategy would go further, encouraging incorporation of this information in home "energy labels" and in mortgage practices, and requiring real estate and lending institutions to provide such information to home buyers, after allowing at least 5 years for voluntary adoption. We suggest adding this provision to the bill. Additionally, the 12 months provided in S. 341 for development of the guidelines is too short for an effective rulemaking process. We suggest 18 months as a more appropriate time line.

Section 3003, Improving Efficiency in Energy-Intensive Industries, would require the Secretary to support at least five joint ventures to improve energy efficiency and productivity through changes in industrial processes in energy-intensive industries. This may be an appropriate extension of the R&D program in waste minimization and process efficiency carried out by the Department's Office of Industrial Technologies, contingent upon the availability of appropriations. However, fixing in statute the number and type of such ventures is undesirable, as it may not provide the flexibility needed to respond to industry interests. Additionally, we would not support displacing our ongoing program of efficiency R&D on industrial technologies to accommodate this initiative.

Section 3004, Report, requires the Secretary to report to Congress every three years on energy efficiency policy options that would decrease domestic oil consumption and overall domestic energy consumption per unit of GNP by 1, 2, 3, and 4 percent per year below the projected consumption for 2005, with the options ranked according to their cost-effectiveness and feasibility. The information sought in this requirement might more appropriately be included in the biennial report to Congress on National energy policy and not tied to a specific projection built on unstated economic and technical assumptions. Additionally, a more appropriate baseline would be current consumption, with a consistent 10-year horizon.

Section 3005, Voluntary Guidelines for Industrial Plants, would require the Secretary, after consultation with utilities, major industrial energy consumers, and representatives of the insulation industry, to establish guidelines and provide technical assistance for the conduct of energy efficiency audits and the installation of insulation in industrial facilities. This provision is consistent with the National Energy Strategy's intent to encourage private-sector industrial audits, but inappropriately emphasizes insulation, which is only one of many energy efficiency measures that should be considered in an industrial facility. Insulation measures typically represent only about 5 percent of the package recommended for medium-size industrial facilities through our energy audit program. There is ample reason to believe that industry will save energy where doing so can be shown to be cost-effective. We recommend instead expanded support of our existing audit program, which also helps to develop our human resources through education of engineering students.

Section 3006, Energy Efficiency Labeling for Windows and Window Systems, would require the Secretary, in consultation with the National Fenestration Rating Council, to provide financial and technical assistance for development of a national program of energy efficiency ratings for windows. If a voluntary program failed to develop, the Secretary would be required to establish such ratings in consultation with the National Institute of Standards and Technology. The Department supports this provision.

Section 3007, Energy Efficiency Information, requires the Energy Information Administration to expand the scope and frequency of the data it collects on U.S. energy use, with the objective of significantly improving the effectiveness of the Nation's energy efficiency policies and programs. The Department supports this provision. The Administrator should coordinate this effort with the States and the Environmental Protection Agency to ensure that the data are consistent by end-use category.

Section 3008, Energy Efficiency Labeling for Lamps and Luminaries, would require Secretarial action with regard to lighting products similar to that required for windows under Section 3006. The Department also supports this provision.

Section 3009, Commercial and Industrial Equipment Efficiency Standards, would extend the Department's existing authority to require testing and labeling of certain industrial and commercial equipment and would require the Secretary to determine whether to set performance standards for electric lights, utility distribution transformers, and electric motors and pumps. The Administration opposes any provision requiring the Secretary to set performance standards for products such as motors where energy costs are only one of many performance considerations. However, such standards are not required by this language. Testing and labeling activities are consistent with the National Energy Strategy, which also recommends that office equipment, which is the fastest-growing use of electricity in the commercial sector, be included among those items authorized for testing and labeling. Finally, if utility distribution transformers are added to this list, we would recommend also including high-voltage (220-volt or above) transformers on customer premises, which can be another significant source of energy use. For all of these products, the responsibility for labeling rules should be assigned to the Federal Trade Commission, as in the previous section.

Subtitle B, Federal Energy Management, would require Federal agencies to install all energy conservation measures with payback periods of 10 years or less, would require the General Services Administration to consider fuel efficiency in purchasing Federal vehicles, and would require a plan for demonstrating energy efficiency and renewable energy technologies in Federal facilities.

The Department favors provisions that would cost-effectively strengthen the existing Federal Energy Management Program, as outlined in the National Energy Strategy and in a proposed Executive Order. However, we cannot support some of the specific points of this subtitle as drafted. For example, the bill gives the Secretary, instead of the appropriate agency head, the responsibility to select contractors for energy efficiency improvements under the simplified process for shared-savings contracts. Additionally, with regard to the $50 million authorization contained in proposed section 556, it is not clear that this would be the optimal funding mechanism for Federal energy efficiency projects. The Administration's budget requests $1 million to study this matter further. I suggest that we work closely with the Committee to find the common ground that certainly exists on this subject.

Subtitle C, Utilities, would require that utility investments in energy efficiency and other demand-side management measures be made as profitable as investments in generation. While we applaud the intent of this provision, which is consistent with the National Energy Strategy's support of integrated resource planning, we believe it goes too far and intrudes inappropriately upon the prerogatives of the States.

Subtitle D, Used Oil Energy Production, would require the recycling of annually increasing percentages of used motor oil between now and the year 2000. It would provide for a credit trading system similar to that contained in the Clean Air Act Amendments of 1990 for sulfur dioxide. As a general matter, the Department supports the use of market-incentive-based regulation where regulation is necessary to address a significant market failure. While not appropriate for every commodity, an economic incentive system such as this may make sense in this instance. However, it should be clear that the energy savings would be very small; more than 60 percent of used oil is already recycled. The benefits of this provision, which have not been demonstrated, would be mainly environmental and should be weighed against the bureaucratic requirements that would be imposed. Furthermore, it is unclear that a credit trading program would be superior to a deposit-refund system. Additionally, the five-year sunset provision appears to be in conflict with the provisions extending to the year 2000.

Subtitle E, Insular Areas Energy Assistance, would authorize the Secretary to provide financial assistance to Insular area governments to encourage the adoption of energy efficiency and renewable energy measures. The Department supports this provision.

Turning now to Title IV, Renewable Energy.

Subtitle A, C0RECT, would expand the duties of the Committee on Renewable Energy Commerce and Trade to promote the development and application in lesser-developed countries of renewable energy and energy efficiency resource technologies. Such action would stimulate the domestic industries involved in manufacturing such products and would encourage energy development that minimizes adverse environmental impacts, and the Department generally supports this provision. However, the language contained in proposed section 256(d)(2) (D) and (E) would fit better in the following section. Additionally, the language contained in proposed section 256(d)(3)(C) that C0RECT "establish feasibility and loan guarantee programs to facilitate access to capital and credit" goes too far. CORECT's chief function is to

serve as an interagency coordinating committee, and such programs should be the responsibility of one or more of the member agencies, not CORECT: The word "encourage" should be substituted for "establish". Also, the report required by section 4003 will require considerable data, both foreign and domestic, and could not be produced by June 1, 1991; a deadline of 18 months from date of enactment would be more reasonable.

Subtitle B, Renewable Energy Initiatives, would expand the number of joint ventures required under P.L. 101-218, the Renewable Energy and Energy Efficiency Technology Competitiveness Act of 1989, to include biofuels energy systems, geothermal energy conversion technology, solar water heating technology, the direct combustion or gasification of biomass, fuel cells technology, and additional ventures in photovoltaic and wind energy systems. Also required are at least two joint ventures for the training of individuals from developing countries in renewable energy and energy efficiency technologies. The Department supports such initiatives, but we would propose that they be made contingent upon the availability of appropriations specifically for this purpose. We would not support requiring such initiatives if they were to be funded out of our core R&D budget at the expense of higher-priority projects. Additionally, the deadline of September 30, 1991, contained in proposed section 6(b)(4) for a draft solicitation is unrealistic; a date of 12 months from the date of enactment would be more appropriate.

Section 4102, Report on Waste Minimization Technologies in Industry, is consistent with the R&D program in waste minimization being developed by the Department's Office of Industrial Technologies, and we have no objection to this requirement. However, in order to stay within the time line contained in the bill, we suggest that it be limited to major processes within certain highly energy-intensive industries—for example, chemicals, paper, and steel—and $1 million authorized per industry.

In general, Mr. Chairman, Titles III and IV of S. 341 are consistent with the direction of the National Energy Strategy and would make useful contributions to the development and wider use of renewable energy and energy efficiency technologies. The Department of Energy looks forward to working with the Committee further to refine the few points of disagreement and concern that we have.

I appreciate your time and attention, and I would be pleased at this time to answer any questions you may have.

Thank you very much.

The CHAIRMAN. Mr. Davis, thank you very much.

I am glad you concur with virtually every provision of our bill. I think it is comprehensive. It will be very helpful. It is a long laundry list.

But that is the way energy policy is made by a huge number of individual acts that are taken. Now rather than going to those items on which we agree, because there is large agreement here, I would like to question you on a number of really important amendments which will be proposed and which offer both great hope, and in the view of some, great mischief and ask you to define which are more hopeful and which is more mischievous.

First of all, DOE establishment of a minimum efficiency standard for incandescent and fluorescent lights. Lighting accounts for 20 percent of all the electricity used in the country and so the potential is great for decreasing our use in incandescent lights and fluorescent lights. Why should we not have a minimum efficiency standard for these?

Mr. DAVIS. The objective of improved efficiency is very important, and lighting is certainly a huge target.

I think the question is the effectiveness of producing information to the consumer so he will understand the efficiency of various products. In other words, will labeling get us the same objective as standards obviously will?

And I think that is the question that we are still trying to come to grips with.

The CHAIRMAN. Do less efficient lights have any particular marketing advantages? Are they brighter?

Mr. DAVIS. We believe that within each of the lighting categories there are more efficient products. So that you are not forcing somebody to stop using a particular kind of light. There are many lighting technologies available and there are more efficient products in all categories of light available in the market.

The CHAIRMAN. I understand this could save 5,000 megawatts. Is that fair?

Mr. DAVIS. I think that certainly, over time, is a very realistic number.

The CHAIRMAN. How about a requirement for power marketing agencies to require power purchasers to use least-cost planning?

Mr. DAVIS. I think that is generally a positive direction. A number of our power marketing administrations have already discussed with their customers those kinds of provisions.

The CHAIRMAN. And you would have no objection to that?

Mr. DAVIS. I would not.

The CHAIRMAN. All right. How about requirements for promulgation of commercial buildings standards? This provision was not included in S. 341 or the administration's NES proposal.

The Conservation Subcommittee is working on an amendment that would encourage States and localities to adopt the energy performance standards for new commercial buildings at least as stringent as the voluntary Federal performance standards for new commercial buildings.

States and localities that did not adopt the tougher building standards would lose access to participation in DOE grant programs such as weatherization under SLAP, et cetera.

What is your view of that?

Mr. DAVIS. Sir, I can comment on the first part. The important word is encourage. I think there are a number of things we can and should do to encourage adoption of better standards. I have not looked at the other option you raised: what would be the penalty if, in fact, energy efficiency standards were not adopted.

The CHAIRMAN. Do you have a better way to get commercial standards?

Mr. DAVIS. If you work at the State and local levels—and I would draw on some of my own experience here as a mechanical contractor—if it is clear to those entities what the benefits are, and I think there needs to be considerable effort made to make that clear, then I think you will see folks move forward. And I think you see them move forward quickly.

I think to go beyond that gets into a lot of local questions that may even make progress more difficult.

The CHAIRMAN. There is a question of expanded use of mortgage financing incentives. This provision was not included in our bill, however, it will be part of the NES package in some form, I understand.

The provision would encourage improvements in energy efficiency by developing and encouraging the voluntary acceptance of efficiency ratings and their use in home financing.

Will you give us your view on that?

Mr. DAVIS. The strategy does include a provision for that. And, in fact, we go a little bit further. We encourage consideration of the information on home energy labels in mortgage practices and would require real estate and lending institutions to provide such information to home buyers.

After allowing at least 5 years for voluntary adoption, we would then require that the information be provided.

The CHAIRMAN. Very well. Mr. Davis, thank you very much.

Senator Wallop.

Senator WALLOP. Thank you, Mr. Chairman.

Mr. Davis, let me make the observation, we talked a little earlier, that the rule of the committee and the hope of the committee is that testimony arrive here in time for it to have some rational opportunity to be studied. It did not.

I understand that it was OMB's fault, but I also wish that you would bring back to OMB the message from this committee that the purpose of a hearing is to develop real information and real attitudes on the part of the administration. It is impossible for us to do that efficiently, since we are talking about efficiency, if we have to get up at 4:00 in the morning and try to do all of these things.

Would you please pass on from this Senator a loud and angry protest to OMB for not releasing your testimony, which was prepared in time, in order for us in the committee to have a chance to peruse it with some care.

Senator FORD. Would the Senator yield just one second?

STATEMENT OF HON. WENDELL H. FORD, U.S. SENATOR FROM KENTUCKY

Senator FORD. The Republican leader, Senator Dole, who is on the Rules Committee, was right emphatic about that in the Rules Committee. And when we were putting out our funding for the committees this week he wanted to mandate that the statements would be here 24 hours in advance.

And my point at that time to him was the problem is not with those who come from Wyoming with their statements. They will have 50 copies that they will ship in a week early. But it is the administration that is always late. And sometimes we get their testimony after they testified. And so I want you to know that I agree with what you are saying.

Senator WALLOP. And in this instance, when it is clear that the testimony was prepared by the Department of Energy, they just could not get it released. While it is not their fault, it is certainly still no help to the committee. And so, therefore, the request needs to go back to the appropriate place.

Anyway, Mr. Davis, thank you, I join with Senator Johnston in thanking you for finding so much in our bill with which you and the administration agree.

I would begin by observing that there are those who suggest that the solutions to the energy crisis, as I mentioned in my opening remarks, is to simply do more with less. It seems to be an almost simplistic view of a world that fails to recognize that we are already doing that. The energy consumption for unit of gross national product is down some 28 percent since 1973.

And the current trend will achieve, according to your estimates, a further decrease in energy per unit of GNP by the year 2000 and more than 20 percent by the year 2010.

Now it is true that there are some countries who do a great deal better than the United States in this regard. But would you agree that we must examine the reasons for the differences that exist in energy consumption per unit of gross national product.

Let me just observe that there are such countries, such as Japan, which have a much higher ratio of GNP to unit of energy consumed than do we. But I would ask you, has the Department examined how that might change were Japan to have an energy base of their own so that then all of a sudden energy production costs are entered into that ratio between GNP and energy.

For instance, for us the mining and transport of a ton of coal requires energy that does not show up in their use of energy per unit of GNP. Has the Department got any kind of figures on that?

Mr. DAVIS. Well, I think as you point out, there are a number of measures that have been used that really do not offer much insight into whether or not we are as efficient as we can be or whether we are comparing ourselves properly with our international trading partners with respect to dollars or BTU's of energy per unit of gross national product. Perhaps we even skip over some of the more meaningful information.

I would say, without getting into specifics, that we are trying to look within our analytic capabilities at what really the most important and telling measures which relate energy to overall economic productivity. I do not think we are there yet, but we are going to continue to look at that very carefully.

Senator WALLOP. Would it then be based, primarily, on what would be achievable within the broad economic base, energy and otherwise, that the United States has?

Mr. DAVIS. Going back to the Japanese example, if you look at a full fuel cycle cost analysis for the Japanese in terms of the energy required to produce the energy somewhere else in the world, transport it, move it, et cetera, and factor that into their use of energy per unit of GNP, it might be more comparable to ours.

We need to look at the analysis more carefully before we give too much credibility to some of these numbers.

Senator WALLOP. In an area such as gasoline, at what moment, or what increase in price, does price begin to have an affect on domestic consumption?

Mr. DAVIS. There are a lot of numbers that have been suggested there, Senator. And there are probably a number of people that could speak to that more directly.

I think there were similar questions submitted to the Admiral after his testimony, and we are trying to respond to those for the record.

Senator WALLOP. Let me move to these concepts and ask you to define, if you can, the difference between least-cost planning and life cycle analysis cost of energy alternatives.

Mr. DAVIS. We have tried to use the phrase integrated resource planning as opposed to least-cost utility planning. I think there is more than just the name itself.

You are going to hear from certainly an expert today in Mr. Reuger. But utilities have had resource planners for years and years and years. They have done the job of planning the resources, they have used information available to them, and they have operated within a regulatory and tax policy structure that has evolved over a number of years.

That is changing. There are a number of other considerations to factor in. And all we are trying to do with integrated resource planning—which I think is probably the best buy in the whole Strategy from my point of view—is factor in more and more of the issues that need to be considered when using limited capital.

Senator WALLOP. In other words, it would appear that some calculations would favor technologies with low capital costs over longer-lived capital-intensive facilities. But in terms of efficient use of energy, that might not actually advance the national cause just on the basis of an analysis of capital costs?

Mr. DAVIS. Yes, sir, that is currently the case. We have tax and regulatory policy that discourages investment in capital-intensive energy production, and encourages investment in low-capital cost, high-fuel cost technologies that may or may not be the best long-term approach.

Senator WALLOP. Mr. Chairman, thank you. I will see if I have some questions that may develop after the others.

The CHAIRMAN. Thank you, Senator Wallop.

Senator Wirth.

STATEMENT OF HON. TIMOTHY E. WIRTH, U.S. SENATOR FROM COLORADO

Senator WIRTH. Mr. Chairman, thank you. Mr. Davis, thank you for being here.

Mr. Chairman, this is a distinguished Coloradan as well. We appreciate that.

Could you provide to us for the record a list of the recommendations and a rational for that that you all submitted to the White House? We are in the process, as you know, of trying to cobble together an overall energy bill. And it would be really useful to get a lot of the very good thinking that came out of that 15-month set of hearings around the country. We have got that broad record, but we would like to know what you all picked out and thought was the most important.

Could you submit that to us for the record?

Mr. DAVIS. Yes, sir. We will do that.

[The information requested was not received at the time the hearing went to press.]

Senator WIRTH. To jump onto lighting standards, you suggested that it was better that lighting standards be left to labeling. It is my understanding that all lighting now is labeled. You go into the store and there are labels on it already. I thought that there were some tougher recommendations that you had originally started with.

If I am incorrect on that, do correct me. But if not, could you let us know what you thought ought to be done in the area of lighting standards?

Mr. DAVIS. We did start with the position that we would add lights to our already-existing authorities in appliance standards. As we further analyzed that particular activity, we asked ourselves whether we could accomplish that with improved labeling so that consumers understand the energy efficiency implications of what they are purchasing.

I agree that lights currently are labeled, but labeled only in terms of wattage—what amount of electricity it takes to drive that light.

Senator WIRTH. It would be useful if we could get that analysis from you as to how that decision was made and what those pros and cons were as we are going to be right smack in the middle of it. And I know the Chairman wants to move this very quickly.

We do not want to reinvent the wheel with a lot of hearings on that. If we could get your analysis, that would be really helpful.

Jumping to commercial buildings, I think, is it not true that about a half of the overall U.S. energy use is on buildings of some kind? Is that not right?

Mr. DAVIS. I think it is probably closer to one-third of all energy in the United States goes to buildings and is roughly split between residential and commercial buildings.

Senator WIRTH. So it is a significant amount. And presumably there are a lot of savings there.

Now if we follow the assumption that this all should be left to the marketplace, we kind of run into a couple of problems. One, that energy prices are probably going down and so we are not going to see conservation driven by prices.

And second, we have in many, many markets a glut of buildings on the market. And we also have a lot of real competition between new buildings. People building those buildings are going to want to do it as inexpensively as possible. That is probably is going to lead to inefficiencies from an energy conservation point of view.

And so the question then becomes if you assume lower prices and that kind of competition among buildings, how do you intervene is such a way that you then also build in some commitments to conservation?

Mr. DAVIS. I think there is actually some important progress being made in the building sector.

If you look at the electricity produced in this country, roughly two-thirds of it flows to buildings; one-third of it flows to industry. Our strategy for the last 1½ years at least is to link up the utilities sector with the building sector. Because, as a number of our leading utilities around the country will show, utilities are looking at how they can acquire resources in the future, and they are certainly looking at investments they can make in efficiency.

And once the regulatory process is straight so that they can do that, there is a substantial source of capital to pursue for those efficiency investments.

Senator WIRTH. And what we ought to do is to be encouraging that. I agree with that completely.

Another question that I had is, did you all do, and I am sorry I just have a number of things and a limited amount of time. My apologies.

Looking at those disincentives, did you all make a list? Has the Department done an analysis of the tax disincentives that exist in the code, disincentives to energy efficiency?

Mr. DAVIS. I think we have a better view of the regulatory barriers. We have started looking at some of the tax disincentives. But I do not believe that analysis is complete yet.

Senator WIRTH. When will that be done, do you know?

Mr. DAVIS. We are certainly under way. And I would be, I will try to provide an answer for the record regarding what we have done and when we would expect to complete it.

Senator WIRTH. That would be great if we could do that because, again, it seems to me on the track we are looking at, we cannot do that in this committee because it is not a tax committee. But when we get to the floor, it seems to me there is a lot of flexibility to begin to look at that.

Have you done anything on home energy retrofits? I was visited last week by a number of conservation companies or companies that are in the business of selling various materials. And they said that the market is moving very dramatically to the home market.

Did you all look at that and see what might be done if there is anything that could be done at the Federal Government in a Federal energy bill to encourage that kind of home market retrofit?

Mr. DAVIS. Again, we took a more broad brush approach to that. The contributions from integrated resource planning, including the retrofit sector, are substantial.

I do not believe that we have considered the retrofit market looked in sufficient detail——

Senator WIRTH. On the Federal energy management program, you said you did not like it as set up. But it pretty much got gutted by the time it got into the National Energy Strategy.

Could you send us what alternative you all have developed to the current Federal energy management program and the cost of the shared savings program? I chair the Alliance to Save Energy. We have done a lot of work on that. And we think that there is a lot of potential in that shared savings program and would really like to see what alternative you thought would have a better bite.

Mr. DAVIS. I would just make one comment about establishing an amount for appropriations. We do have a concern that if we indicate a specific amount to be appropriated, then many of the other agencies would be less aggressive and would simply stop what they are doing and try to draw on that fund rather than act first within their own budget request.

Senator WIRTH. If I could jump very quickly to two other items.

One, in renewables, I noted in the President's budget, I think, even less than 3 percent of the overall budget for Energy is focused on renewables. Again, we can get into a debate about how much should be. I think it should be significantly more.

But maybe you could give us your analysis on—and as we think about the commercialization of renewables. I know you all were looking at market barriers to renewables.

And, again, for the record, as we try to put together legislation here, if we could get your analysis as to what those barriers were, both to commercialization and to export. It seemed to me they were two very significant areas of potential there of moving renewables

into commercialization and moving renewables into the export market.

I understand that you all had done a good deal of work on both of those. Is that right?

Mr. DAVIS. We would be happy to provide that information for the record.

[The information requested was not received at the time the hearing went to press.]

Senator WIRTH. And finally—I was looking in the transportation sector. Did you all do an analysis of the potential of gas sipper/gas guzzler legislation, how we might better reward efficient cars and not reward inefficient cars instead of going to a CAFE standard or as a supplement to a CAFE standard?

Mr. DAVIS. I am aware that there were some analysis done on that approach early on in the process. So there should be some analysis.

Senator WIRTH. Would it be at all possible to get that for the record as well?

Mr. DAVIS. I will certainly try and do that.

[The information requested was not received at the time the hearing went to press.]

Senator WIRTH. Thank you very much.

Just as a final note, when there were comments made earlier on the low-income weatherization program and that that had been reduced, as I understand it, some of the rational for that was that this was going to be funded with oil overcharge funds.

We took a look and asked the Governors' Conference about that. And they said that the oil overcharge funds are largely obligated or have been spent. So there really is not funding for most of the low-income weatherization programs, which would, again, appear, going back to the energy building efficiencies, would appear to be one opportunity to break into that. And maybe that information is incorrect about that. But if the administration was assuming that oil overcharge funds could be used, we probably ought to get some information as to what funds they thought would be available to do that.

Mr. DAVIS. We can provide that information.

[The information requested was not received at the time the hearing went to press.]

Senator WIRTH. Mr. Chairman, I thank you very much.

Secretary Davis, I thank you. There is a lot of material. But we have a long way to go and we really appreciate your commitment and good work.

Thank you very much, Mr. Chairman.

The CHAIRMAN. Thank you, Senator Wirth.

Senator Craig.

STATEMENT OF HON. LARRY CRAIG, U.S. SENATOR FROM IDAHO

Senator CRAIG. Thank you very much, Mr. Chairman.

Mr. Secretary, we do appreciate your presence this morning.

We think it is very important in our effort to craft a policy that we remain cognizant, as the administration has, in relation to a policy that has the marketplace in mind. I do not see us being very

successful, in spending a lot of wasteful time and probably money, if we are not overly sensitive to how the market is going to respond or how human interests will.

You, in section 3003, talked about improving efficiencies of energy-intensive industries and about the five joint ventures talked about in the legislation and your opposition to them. I can understand why you do not wish to establish or adhere to, respond to, some rigid guidelines in specific projects, but it concerns me.

And I would like to have you reflect on what our national laboratories are doing now in those areas associated with industry, doing some tech transfer, and the types of efforts that are already underway.

I think we are missing the opportunity if we do not recognize what is already going on and stress some stuff that is already on the drawings boards or in the laboratories that could be moved quickly from the public sector into the private sector and rapidly adapted.

I know that a good deal of that is going on. I think we ought to put greater emphasis on it. My colleague from Colorado a few moments ago talked about some of those kinds of rapid movements.

Could you respond to that?

Mr. DAVIS. Let me first talk about joint ventures. We are not opposed at all to joint ventures. In fact, we have taken, I think, a broader approach based on this committee's legislation last year.

Senator CRAIG. You are concerned about the restrictions. You are already talking about joint ventures?

Mr. DAVIS. Yes, we are. But let me try and address that specifically.

We believe that joint ventures are an activity that is a natural outflow of a number of the research programs we have underway. We clearly believe that.

Within our technology development activities, we are, I think, out ahead in terms of having industrial participation that is essential to make those programs work. We start with our industrial constituents in the planning phase. A lot of work is joint funded, and we are moving more in the direction of increasing that cost share.

Now with respect to the national labs, there are a number of examples of what I believe are very productive joint ventures where we are dealing with important private sector players. And the national labs are part and parcel to that team.

There are very important capabilities and facilities that industry does not need to rebuild or invest in and that are available from the national laboratories. We have examples in each sector, buildings, transportation, industry, and utilities where we have got underway what I consider to be joint ventures.

Our concern with joint ventures is that if they are too detailed that may not be consistent with where the technology or the industry really wants to be. And if they come in place of the fundamental R&D programs or the base R&D programs that we have focused now, I think, very well, that could be a problem

Senator CRAIG. I guess my concern is that we well understand what we have going on and that we do not establish the restriction or rigidity that disallows that kind of progress. We ought to ampli-

fy or encourage or accelerate that which is going on and certainly not move toward any duplicate effort that is simply going to cost money and result in wasted money and less productivity.

While I thank you very much for that, I would ask that we might see an accounting of, if you do not have that available, of those kinds of joint ventures that are already under way for this committee and in all of our laboratories and how we might adapt or conform whatever legislation comes out of this committee in a way that does not stifle that effort, but encourages it.

Mr. DAVIS. I believe this committee is headed in the right direction to encourage joint ventures. We just want to proceed very carefully.

Senator CRAIG. Thank you. Thank you, Mr. Chairman.

The CHAIRMAN. Thank you, Senator Craig.

Senator Akaka.

STATEMENT OF HON. DANIEL K. AKAKA, U.S. SENATOR FROM HAWAII

Senator AKAKA. Thank you very much, Mr. Chairman.

I may be one of the new members of the committee, but my concern about America's energy future is not new to me. Throughout my 14-year career in the House sometimes I felt that I was fighting a lonely battle against the Federal Government's dwindling commitment to renewable energy.

During the decades of the 1980's the administration pushed for deep cuts in renewable energy research. Last year's budget contained 20 percent of what it was a decade ago.

And so some of the members here, Mr. Chairman and Senator Wirth, have mentioned the lights. And I would like to reference that by saying that I am pleased that the Department of Energy is finally beginning to see the light when it comes to the value of promoting renewable energy technologies.

I hope this does not continue, but it brings tears to my eyes when I think of all of the lost opportunities we have missed over the past decade of neglect in this particular area. In the face of these cuts, other countries have gained in energy technology and we have lost ground on that.

I want to mention just two issues that we need to pick up here. One of them is conservation. And I am glad to see that strategy does include that. I believe conservation is one of the areas where we can make large gains. And the other, of course, is development of renewable energy.

One page 119, Mr. Davis, of the National Energy Strategy, the Department of Energy has recommended that the 10 percent investment tax credit for solar and geothermal be expanded to wind and certain biomass technologies. This is a bold move, I feel, but I applaud you for that. Solar, wind, and biomass are all emerging technologies and they should be treated differently under the tax code.

My question to you, Mr. Davis, in addition to expanding the tax credit to wind energy, would you explain which types of biomass would be eligible for this tax credit?

Mr. DAVIS. Sir, I have to correct an error here. I do not know how this happened, but it turns out that the actual provision does extend the investment tax credits for another year but does not extend it to include wind and certain kinds of biomass. But I would be happy to tell you what we had in mind for the certain kinds of biomass.

Senator AKAKA. You mean there was a mistake?

Mr. DAVIS. There was an error in the document. Yes, sir.

Senator AKAKA. I am very disappointed in your response, naturally. After 18 months you mean that the administration cannot make up its mind on this basic issue. The administration, Mr. Chairman, I was surprised to learn that this morning fumbled an important opportunity on wind and biomass tax credits. And I intend to pick up where the administration has fumbled, Mr. Chairman.

In earlier drafts, Mr. Davis, of the National Energy Strategy, the concept of a production credit was advanced for renewable technologies. This would have encouraged actual production of renewable energy in a way that is more direct than a tax credit which encourages capital investment. My question is would production credits offer a reasonable alternative to the investment tax credit for encouraging renewable energy generation.

Mr. DAVIS. Well, I personally think they would. Production incentives would be a major shift in policy with respect to renewables. The difference is between an input incentive which is an investment tax credit, and a production incentive which pays only if and when the desired result is obtained.

The production incentive has another advantage. It is possibly a way of opening up utility investment to renewable technologies where current investment tax credits may not be quite as attractive. So we think it is an option that deserves careful consideration. We have given it some careful analysis, and as Senator Wirth suggested, we will submit that for the record.

Senator AKAKA. Finally, Mr. Chairman, I note that the Office of the Press Secretary issued a national energy statement and, under increasing energy and economic efficiency, have stated some of the highlights—and I am so glad to see these highlights as was expressed this morning. But my particular question is on the highlight that reads, proposing to invest a Federal share of up to $150 million from fiscal year 1992 to fiscal year 1996 in a new research program with the automobile industry to accelerate the development of electric vehicles. Can you say a word about that and tell me whether the commitment is there for $150 million?

Mr. DAVIS. DOE has invested in a variety of battery technologies over a lot of years, and one could raise a question about how efficiently it was done. We went to Detroit and suggested to them that if they were willing to focus their resources and their attention on a smaller number of battery pairs, that we would do the same. And hopefully, we would make better progress.

So we have ramped up our 1992 budget request to reflect that, but certainly the year-by-year appropriations that are necessary to support progress in the National Energy Strategy are very important to our success.

Senator AKAKA. Well, thank you very much for your responses. Mr. Chairman, the staff and the Secretary himself have been very helpful to us in Hawaii, and we really appreciated some of the staff that has come out to Hawaii in the past, and we look forward to working with you. Thank you very much, Mr. Chairman.

The CHAIRMAN. Thank you, Senator Akaka.

Senator Burns.

STATEMENT OF HON. CONRAD BURNS, U.S. SENATOR FROM MONTANA

Senator BURNS. Thank you, Mr. Chairman. And Mr. Davis, thank you for coming this morning as we go through this and work our way through these two approaches, which are very similar, I would have to say, in kind.

I am happy that I throw renewables and conservation into one definition almost because I think the basic thing that we are looking at is some way or another taking our energy in the direction of finally one day, when the technology is available and the work has been done, that we wean ourselves off of fossil fuels completely—not only from an environmental standpoint, but also the standpoint of it is a finite resource and one day we are going——

Energy providers, despite the perception, are working very hard and expending millions of dollars each year in research, not only developing fossil fuel that will burn cleaner, but less of it. I am looking for the day when fossil-fuel based energy, which is oil, will be completely phased out.

One must remember that the vast amounts of that capital to carry out those research projects has to come from profits. In other words, I think whenever we start going into changing the direction of policy, we fail to take into account that the marketplace will be the main thrust that most of these programs if they survive.

So I would urge that as we work our way through this and the R&D credits given to those energy providers, and also the providers of automobiles and this kind of thing, to codify our R&D tax credits, number one, where they are not renewed every year, and to put those into law that whenever they expend that they are going to get some kind of credit for it.

And also whenever we start talking to the automobile companies, we get into an area of antitrust, they cannot talk to one another and share some technologies that would benefit the entire industry.

And so if there is one direction in both of these bills that sort of concerns me is that there is not real clear direction in either bill of a philosophy on which direction we should be going. I happen to believe that there are those of us that are not scientists, in fact we were not even political science majors that get elected. And we start studying it, but we are not scientists where we can identify that direction. And there are some of us that would deny profits to companies that have to have those dollars to carry out this research.

So mine is more of statement more than anything else that I think I am looking for the thrust because basically and ultimately the marketplace will be the driving force of an energy strategy.

And so areas like natural gas and the areas of the R&D expended I am concerned about.

When we start talking about natural gas, we are talking about an R&D program out here by the National Labs that we get awfully good lip service on the use of compressed natural gas. It is clean burning. We have got a lot of it. And then we look at the budgets and we see very, very few dollars expended for its research and use, especially in the engines and that type of thing.

So that is what I will be looking for as these hearings move along and how that is drawn out, and it is elastic.

Also in the areas of renewables. I think agriculture has a part to play here. I think the development of those crops that produce large amounts of alcohol. We have 40 million acres that we, as American citizens pay for in set-aside programs. Now part of that is erodible land and should not be used, but nonetheless—and for conservation and for wildlife habitat and all of this—but nonetheless I would venture to say that we have got 20 million acres in this country available to produce these renewable crops that provide us some type of an energy source. So there again, do we allow agriculture in this thing to make a profit, develop those, and get them into the marketplace.

Those are some of the concerns that I have as we move this bill along. Specifically I will be coming—if not a bill of my own, but I will have specific amendments as we move along, and it will be in that direction. And we will be in discussion as time moves along. That is the statement that I have. And the specific questions, why they will all be answered as we move.

So thank you for coming today. And it is wonderful. And even though whatever happens in the Middle East, this is a thrust that we cannot let die on the vine. It has to be done now no matter what the results are in the Middle East, or the cost of the Middle East. Thank you.

The CHAIRMAN. Thank you very much, Senator Burns.

Senator Wellstone.

STATEMENT OF HON. PAUL WELLSTONE, U.S. SENATOR FROM MINNESOTA

Senator WELLSTONE. First of all, I just want to echo your conclusion, Senator Burns. I think that was well stated, with a lot of power and influence.

Mr. Chairman, first of all for you I am very please for you that have started off these hearings, I think historical hearings, to develop once and for all a comprehensive national energy strategy and that we begin with a focus on efficient energy use and renewables. For my own part, I believe that that should be the cornerstone of national energy security policy—a policy that protects the environment. And I also think that it is key to economic vitality.

Mr. Davis, I would like to thank you for your testimony, and I have just one or two specific questions that I would like to ask you. Prominent among the DOE proposals crossed out by the White House, I like to say Sununu'ed, and not yet included in S. 341, is one that provided for a 2-cents-per-kilowatt-hour tax credit for re-

newable energy technologies like those prominently featured on the cover of your report.

In testimony that he submitted, Mr. Rueger of PG&E stated that we need to establish incentives that would, "remove the current biases toward fossil fuel using technologies." And I would ad biases toward nuclear power in the proposals before us. According to Mr. Rueger, "production related incentives are likely to be more effective an efficient than investment tax credits in advancing immature industries."

Now I know that there is legislation in the House that would give a 2.5-cent-per-kilowatt tax credit for renewables, and the question that I want to ask you, Mr. Davis, since this proposal was a part of your original work, which I think was very good work—I am sorry about what happened to it in the White House on its way to the Senate—is what difference would such tax credits make? What is the right amount of tax credit needed to establish?

And Mr. Chairman, I promise not to use the S word, the subsidy word, but what difference would this tax credit make in providing a level playing field with fossil fuels and nuclear?

And then finally, do you think it would be a good idea—and this is really my bottom-line question for you—do you think it would be a good idea—and I want to say this slowly and clearly—to put renewable energy tax credits back into this bill?

Mr. DAVIS. In our proposal there is an extension in the investment tax credit. But there is a distinction between an input incentive—an investment tax credit and an output incentive, which is where the production incentive is headed. I personally believe that if you are going to use public funds to encourage certain kinds of activities, those activities should be successful. A production incentive is aimed at the actual production of electricity and is held in place only as long as that production is actually delivered.

I think there are parallels in the natural gas industry where that particular approach has achieved the desired objective. It comes at some cost. If you assume that it is going to be successful, it is a substantial cost relative to other ways we might be able to move the whole energy infrastructure forward. We need to view the production incentive in comparison with all the other options that we could pursue.

We have looked at it, and as I mentioned to Senator Wirth, we would be happy to provide that analysis for the record.

Senator WELLSTONE. At one point in time, at least as included in your original report, I take it you thought that this would be part of a successful—I mean I have here the crossing out of it. Would you provide me with your original, and then are you going to provide that to Senator Wirth. I would like to see your original thinking about this and the case that you have made for it since it was once upon a time a part of the strategy.

And again, I guess I would like to ask the question once more. Do you, in your own best estimate—I mean you have done some pretty marvelous work, I think, when it comes to saved energy, efficient energy use and renewables—do you see this an important part of an energy policy to have tax credit for renewables? And could I add, also not just for renewable, but I also think I would like to ask

the question whether we might apply such tax credits to saved energy?

Mr. DAVIS. Well, I think the best approach here is that within the Department of Energy we have increased our ability, as we needed to, to look at a variety of options. We have looked at those options and tried to develop the pros and cons to put each option in clear view. And then we tried to take the options and compete them one against the other in an overall bundle. And I think that really is a process I would like to stay with because it is a legitimate competition where considerations are not taken out of context.

But there are various ways to "incentivize" any form of energy production. And I would, encourage the committee—and the chairman mentioned this last week—to go back and look at all the incentives that actually flow to the entire energy infrastructure today and decide as a group whether we are actually getting the desired outcome. Because that may be a lot of the resource we need to invest in our future.

Senator WELLSTONE. Yes. I think that may be my point. I see a variety. Again we get back to—we may not want to use the word subsidies—I see a variety of incentives for oil. I see a variety of incentives in the nuclear industry, but I do not see those incentives for renewable energy or for saved energy and it seems to me that as long as you do not have those incentives, it is not really a level playing field. Would you agree with that assessment?

Mr. DAVIS. I would not agree with you that there are not incentives for renewables. There are incentives for renewables. PURPA is an example, and it has been discussed here before. It is a very important incentive and has served, I think, a good purpose in terms of bringing renewables forward.

So there are provisions out there to try and encourage these investments. The question is are they the most efficient set you can imagine. Are they right for the future? And if not, what other kinds of options would anybody propose, and how do they compete?

We certainly want to work with the committee in trying to analyze the various options and how they compete.

Senator WELLSTONE. I will not belabor the point and would like to give others an opportunity to ask questions. I certainly would urge you to revisit what was your original proposal, which was the 2-cent-per-kilowatt-hour tax credit for renewable energy technologies. To my own mind, that is going to be key if we move forward on the renewable front. And for my own part, Mr. Chairman, I very much would like to see our committee consider this as a part of what we do.

Thank you.

The CHAIRMAN. Thank you very much.

Senator Seymour.

STATEMENT OF HON. JOHN SEYMOUR, U.S. SENATOR FROM CALIFORNIA

Senator SEYMOUR. Mr. Chairman, I have statement I would like to file that I will not take the committee's time to read.

The CHAIRMAN. Without objection, that will be included in the record.

[The prepared statement of Senator Seymour follows:]

PREPARED STATEMENT OF HON. JOHN SEYMOUR, U.S. SENATOR FROM CALIFORNIA

Mr. Chairman, I join you in extending a warm welcome to Secretary Davis this morning and thank him for his willingness to discuss with the Committee the energy efficiency and conservation measures of both S. 341 and the National Energy Strategy.

I strongly believe that conservation and efficiency measures must guide the nation's efforts to reduce both energy waste and the economy's continuing dependence on oil. In addition to producing cures for a number of America's unhealthy fuel addictions, efficiency and conservation methods can also uncover new manufacturing technologies to enhance the competitiveness and export potential of our heavy industries.

Furthermore, they could make the dream of home ownership become a reality for thousands of more Americans since next to mortgage or rent, energy expenses consume the bulk of any household's net annual income.

Finally, we must not forget that many conservation initiatives require more willpower than exotic or time-consuming research studies.

The Alliance to Save Energy, for example, estimates that the federal government, as America's largest energy consumer, could reduce its total energy bill by twenty-five percent using proven and available technologies.

I therefore commend the Department of Energy for committing itself to improved lighting techniques within federal buildings as well as a variety of conservation demonstration programs in government-owned housing and other facilities across the country.

At the same time, I urge the Department to take a more aggressive approach to conservation measures within its own house of the federal system as it looks toward the full implementation of the National Energy Strategy.

I also would like to welcome one of my own constituents here today—Greg Rueger of the Pacific Gas and Electric Company. Thanks to the innovation and leadership of PG&E and other utilities from my state, the reliance of California's electric system on oil has gone from 80 percent to almost zero percent over the course of twelve years.

I am pleased to note that Rueger refers in his prepared testimony to PG&E's "lengthy experience" with energy efficiency devices. This experience has helped to make California the nation's leader in generating electricity from several clean sources such as waste heat, wind, geothermal steam, and solar collectors.

I look forward then, to hearing the testimony and insights of all of our distinguished witnesses. Thank you, Mr. Chairman.

The CHAIRMAN. Senator Ford.

Senator FORD. Mr. Chairman, thank you. Let me also add my compliments to you for what you are attempting to do here. And I intend to help as much as I possibly can to put this together.

I guess my problems come a little bit from what the distinguished Senator from Montana, Senator Burns said. He said he wants a marketplace to be the driving force. Well, we have tried that for a decade, and you see the problem that we are in today. That we have gone from 35 percent imported oil to 54 and 55 percent, and the marketplace has now put us in the Persian Gulf.

And he also talks about bringing agriculture in. Well, the farmer wants to make as much off a bushel of corn as he possibly can. But those plants that are transferring corn into ethanol, when corn goes up a little bit, they cannot produce ethanol at a few cents more per gallon to put it into the gasoline, and then have oil companies refuse to take it as gasoline. So not only does the farmer not have a steady income, but the ethanol plant is put out of work. It is closed down. It is cold.

Somehow, somewhere, we have to have something that stabilizes the ability to get renewables into the market. Maybe the tax incentives. We have had tax incentives as it relates to ethanol forever and yet, as the price of corn goes up, the oil companies refuse to take it, and therefore they raise the gasoline a penny a gallon, or whatever it might be. And so then the farmer is out again and the ethanol plant is down. And millions that we have put into it have not stabilized it, and so I am worried about the marketplace. Something has to stabilize it.

Secondly, you have in your proposal, I think on coal, coal to liquid. Is that not correct in the overall energy strategy that the Secretary brought up here the other day? Well, coal to oil is what that means, and we find that the oil per barrel is above the cost of oil, and we never will be able to meet whatever the Persian Gulf wants to make the price of oil. If we are doing too well in coal to liquids, they will lower the price and we are out of the ball game again.

Somewhere along the way we have to stabilize that industry so we can continue using our own resources and be energy self-sufficient. And you talk about it is not a good use of public fund. Well, I can look at the last 10 years and you have nickeled and dimed to death all of these studies. And this, as I look at it, study this, study that—hell, let us build a white elephant once and see if it works. If it does not work, set it aside and go on to something else.

I am beginning to think that we find our labs out there that we are talking about—they keep working on and keep working on—they do not want to give up a project. If they give up a project, they may not have their job. And so therefore, we have to get the labs involved and they have to spit out into the public consumption whatever research they have been doing.

Now we find General Motors is coming out with this big program to make engines that will take natural gas. Well, that is being pushed by the parcel post services, UPS, Federal Express and others, because they have the big fleets and they are now using the motors put out by General Motors. They have been using them for years. Something ought to be mandated that that motor does come out. Because it is a direct user of natural gas, not a combined fuel user.

Then we have to be very careful in studying what they do. A truck for one of the parcel services may deliver a full truckload within 10 miles of the garage. The next truck may deliver one in 150 miles of where it is garaged. So we have to be very careful that we do not get things so tight that we put them in a position of saying no. And so I have got a lot of concerns about this. But I think we are on the right track, and I compliment the chairman.

If you want to respond to anything I have said, I will be glad to hear that, but I have no questions for you, Mr. Secretary. And I go back to the—I say "Sununuted"—part that you sent to OMB that could have given us an opportunity to do a whole lot more and to help the consumer a whole lot more. So if you want to respond to my statement, that would be fine.

I have no questions, Mr. Chairman.

The CHAIRMAN. Mr. Davis, did you want to respond?

Mr. DAVIS. Yes, sir, I would like to respond in particular to the biofuels area.

We have gone from a $9 million program in 1990 to almost a $30 million program in our 1992 request in conjunction with the Department of Agriculture. And we believe that we have got the science in hand to use a variety of feed stocks, other than corn, but not to the exclusion of corn. These are new product lines that farmers can grow with less energy on poor land and still have profitability.

Senator FORD. Are you talking about canola as one of the oils?

Mr. DAVIS. No, sir, I am not. I am talking basically about wood—cellulose—biomass that we can convert to liquid.

Senator FORD. That certainly helps my farmers down in Kentucky to substitute that for tobacco.

Mr. DAVIS. We believe these crops can be grown throughout the country, and again this is analysis now, but we are pretty comfortable with it because we have done it in conjunction with the Department of Agriculture.

Senator FORD. But ASCS will not even encourage the farmers to grow canola and other things to get a double crop. We are trying to be efficient, but the Federal Government—you are talking about working with Agriculture—farmers get their throat cut. The stomach thinks there is nobody feeding it.

Mr. DAVIS. We believe that we have options to convert biomass competitively to ethanol, and in fact, methanol, and we can get there without subsidy eventually.

Senator FORD. Well methanol is worse on automobile engines in the present use than oil. Methanol tears up an engine. You ought to stay with natural gas, if you can, because that works.

Mr. DAVIS. There clearly are parts of the country where natural gas will be the answer. There are other parts where I think other fuels need to be considered.

The CHAIRMAN. Thank you, Senator Ford.

Senator Murkowski.

STATEMENT OF HON. FRANK H. MURKOWSKI, U.S. SENATOR FROM ALASKA

Senator MURKOWSKI. Thank you, Mr. Chairman. And thank you, Mr. Secretary. I am curious with your responsibility specific in the area of conservation and renewable energy and the terrible dilemma of the marketplace dictating the use of different types of energy, and the realization that oil is a worldwide commodity, and I gather that the Mideast must control about 55 or 56 percent of the world's production.

I have been on this committee for 10 years, and we have talked about alternative energy and how we are going to make gasohol competitive. And then the price of oil drops and the economics simply dictate that gasohol, or some of the other alternatives, are not competitive in that particular time frame of cost per Btu, and away we go.

Other suggest that as we develop this energy package that energy efficiencies and renewable energy is the linchpin. So my question to you is as you address the realities of when the Persian

Gulf conflict is over and those countries rebuild, particularly Kuwait. The Saudis are going to probably reduce production. But they are going to want to maintain a price structure that is very favorable to continued dependence on oil.

Then coupled with that you have the tremendous increase in the Third World nations as they look at their future which requires more automobiles and a greater dependence on oil.

I am told by my staff that the Office of Technology Assessment figures indicate that developing countries' oil consumption will increase by 155 percent over a 25 year period from 1985 to the year 2010. And developing countries are going to be expected to make up 40 percent of the worldwide consumption by the year 2020 up from 23 percent now. So it is nearly double.

So if you analyze a total U.S. energy savings from the propose energy conservation, which I am very much in favor of, and efficiency, renewable energy resources, do you believe that these measures alone will be sufficient to solve the Nation's energy problems?

We can control, obviously, renewable energies because we have control of that. But oil is a worldwide commodity, and its flow depends upon the ability to produce and have the reserves and right now the Mideast serves as that leverage point, if you will, by controlling the supply and demand, and clearly those countries have their own best interest at heart. And that is to maintain a significant level of production at a price range that fits into the parameters that keeps out the gasohol and other things.

How in the world do you address a resolve of the nature of your responsibility as the Assistant Secretary for Conservation and Renewable Energy with all of these alternatives that you really do not control. If we controlled the supply of oil as the Mideast does, you could say well, we are going to jack up the price of oil to the point where we can afford to bring on many of our alternative energy potentials such as gasohol, et cetera.

Mr. DAVIS. I think the way I would answer that is the more you look at this whole proposition, I do not believe the constraint is energy resources.

Senator MURKOWSKI. I am sorry, I did not hear you. You did what?

Mr. DAVIS. As I look at this further and further, I do not think the constraint is really energy resources. We have energy resources in this country, and we have them all over the world. We maybe have to rethink what some of those resources actually are, but I think the constraints are technology to utilize the resources sufficiently. I think the restraints are human resources we need to be smarter about some of these things—and I think probably very quickly the real constraint is capital.

I think the strategy tries to point out that there is absolutely nothing wrong with low-cost, abundant energy. It is wonderful that we have got that opportunity in our economy. But the $64 question is what do you do in the meantime? What investments do you make in the meantime so that when that option is not there as we currently enjoy it, we have got other options. And in those options, lie our ability, I think, to react properly to the international energy market. We are always going to have to do that.

Senator MURKOWSKI. Well, in doing it the reality addresses some kind of a consistency that the marketplace continually interrupts. And I am speaking, if we look at alternative fuels, unless we are prepared to subsidize and maintain a consistency, why the private sector, the investment community is going to be very reluctant to go into these areas. Is that not correct?

Mr. DAVIS. I think that is correct. You have to factor in a number of things. We have got a substantial commitment in terms of technology development. Technology development in terms of efficiency technologies, technology development in terms of renewable technologies, technology development in terms of enhanced oil recovery, technology development in terms of better engines, et cetera, et cetera. That is a level of investment that we are making in our future.

And I think that we, at least on the Department of Energy side, are increasing our ability to look at various investments that you can make and what the benefit of those are. I think that is the competition we have to have. And I think we are going to have to continue to get better at that challenging process of trying to decide what the options are.

Senator MURKOWSKI. I do not disagree with you. I guess where we are kind of passing in the night is since we do not control basically the substantial reserves of oil in the world, but other countries do, and they can negotiate that price to basically effect the economics of many of these alternative energies that we are desirous of bringing on, where is our leverage?

Mr. DAVIS. Maybe I can use SPRO as an analogy.

Senator MURKOWSKI. Well, SPRO is so infinitesimal.

Mr. DAVIS. But certainly, I think it has been shown to have an effect here recently in terms of what the market did and did not do. And I think if you extend that thinking, the fact that it is there and the fact that we can use it gives us an option. It gives us a small option, but gives us an option. If you continue that analogy, you might want to invest in those technologies that indeed give you an ongoing option, and maybe a renewable option so that we eventually can transition away from oil. And it is going to take a long time.

Senator MURKOWSKI. Well, you see my point is as we make a transition away from oil, the third world is going to increasing their dependence on oil. Is that not correct?

Mr. DAVIS. Certainly that looks like the direction today.

Senator MURKOWSKI. It appears to be that that is the case. So the demand for oil as we still need oil is going to put our Nation in still a dependence position as far as oil is concerned because we are certainly going to continue to need it for specific transportation matters, airplanes, and so forth.

Mr. DAVIS. That is clear.

Senator MURKOWSKI. Okay. And each year, I believe, there is a requirement of your department that if we are dependent on imports for over 50 percent there is a report to Congress, or something of that nature. It is supposed to be a signal that we are becoming overly dependent and therefore, we theoretically ought to do something about it. But we have not developed anything until

now when we are talking about developing an energy policy which hopefully will address dependence on imported oil.

We have not done anything about this in the past, even though we have had a reporting requirement. Is that right?

Mr. DAVIS. I am not aware, sir, of what has been provided in the past in terms of reporting our dependency.

Senator MURKOWSKI. I will conclude because I have taken up more than a sufficient amount of time. Where we are kind of hung up, is the concern that if we do not initiate simultaneously a savings—conservation, alternative energies, as well as increased production—we are still not going to be able to maintain our position because while we may be flat in our oil consumption in the future and Europe may be somewhat flat, and Japan may be somewhat flat, but the Third World countries are going to be increasing.

As we are not bringing on new fields, not bringing in exploration, our dependence is still dependent on other countries. And as a consequence, we have to have whatever the dictate might be because you do not generate production over night. It takes a long time in a planning process.

Mr. DAVIS. Sir, I certainly agree with that. And I think the strategy is clear that we do not believe in any way that you can "conserve" your way out of this particular situation. It does take the approach that I think the committee and the National Energy Strategy are both suggesting—a balanced approach with new production as well as increased efficiency.

Senator MURKOWSKI. Thank you, Mr. Chairman.

The CHAIRMAN. Senator Nickles.

Senator NICKLES. I will pass, Mr. Chairman.

The CHAIRMAN. Senator Conrad.

Senator CONRAD. Thank you, Mr. Chairman.

Mr. Davis, what percentage of our total energy is used in the transportation sector?

Mr. DAVIS. Out of a total of about 85 quads of current consumption, the transportation sector is roughly 22 quads. So that arithmetic is, I think, a little less than 30 percent.

Senator CONRAD. Roughly 30 percent, a little less than 30 percent.

When I look at the National Energy Strategy, the part that just leaps out at me as being sadly deficient, in terms of the administration's proposal, is with respect to the transportation sector. And specifically, I am referring to a lack of anything serious on CAFE standards. What we have is a study. God knows we have had enough studies.

Can you tell me why there is nothing serious in terms of a proposal on CAFE standards? Specifically, was it included in your recommendations to OMB and to the administration?

Mr. DAVIS. All I would offer, and I think this is a point the Admiral made last week, is that the information that the National Academy of Science is bringing forward on what can be accomplished here by the 1st of June, important because it would not suggest the bias of either DOE or the Department of Transportation. As the Admiral indicated we are prepared to, once we have that information in hand, to react to it.

Senator CONRAD. Let me ask again. Was it not in your original proposal that we have CAFE standards increased? In the work that came out of your office?

Mr. DAVIS. I can say that one of the options we looked at was various ways to increase CAFE. We looked at those options——

Senator CONRAD. Did you make a recommendation, a specific recommendation, that CAFE standards be increased?

Mr. DAVIS. We put forward an option in that regard and we put forward the pros and cons. We did not recommend that option, if you will, any more than any other option. We tried to put the option in context. And we tried to offer those as an overall package.

Senator CONRAD. You are very diplomatic. But my information is, and the copy that was leaked, said that you specifically proposed the CAFE standards be part of this overall plan. If you did, which my information suggests that you did, I salute you for that. Frankly, I think as you look at this proposal, it is going to be very hard to sell as comprehensive and serious if we do not do something significant with respect to CAFE standards.

We are talking about 30 percent of the energy use in this country. And what we propose is a study. And I just, for my part, cannot go to any serious audience and say, look, we have really done a job in terms of a comprehensive strategy when we look at 30 percent of our energy usage and our answer is a study.

Let me ask, in the alternatives area one of the things that has been referenced frequently is we look at the marketplace and we are told let the marketplace decide. So you start to examine the marketplace. And one of the things it shows us is we go to our friends in the Gulf and they can produce oil for $1 or $2 a barrel and they have got a 50-year supply. And is not that going to prevent the development of any meaningful alternative here. Which raises the question of what is the goal here? What is it that we are trying to do?

Are we trying to become less dependent on foreign sources? Is that a key goal? Are we trying to simply have a marketplace determination? Or is there a recognition that there has got to be Government action because in allowing the marketplace to work, we have become 50 percent dependent.

What would be your analysis of what is the goal here? What is it we are trying to accomplish?

Mr. DAVIS. I think we are truly trying to allow the market to do what it does best. I think there are some things that the market does very well, which is deliver to us abundant, low-cost energy.

And, again, I would go back to the $64 question, which is while we are allowing that marketplace to work, what other investments do we make in our future so that we are not continually up against the wall.

And while there may not be a CAFE provision, there are a number of very important provisions in the National Energy Strategy to get to the technology side of the equation in terms of better vehicles, electric vehicles, other kinds of alternative fuels that are very important and will need continuing support in terms of appropriations.

There are a number of measures that I would certainly stand behind as good steps forward with respect to transportation sector.

Senator CONRAD. I would, too. Make no mistake about it. I appreciate some of the things that are in there. But I think any serious observer would look at this and say, you guys have not done what needs to be done if we are going to be serious in dealing with the situation in which we are 50 percent dependent; you guys have got to get serious.

Let me ask one other question with respect to alternative fuels. My people tell me at home, we have got ethanol plants that with the current price structure we are in danger of losing those plants.

At the very time we are putting together a national strategy and at the very time we identify alternative fuels as one element and at the very time we have got clean air legislation that talks about the need for ethanol and ETB, especially in those areas that are non-attainment, we have a marketplace that is pushing those plants towards closure.

What is your judgment? Should we allow that to happen? Or should we take steps to try to prevent those plants from being closed?

Mr. DAVIS. I recall a personal experience when the marketplace pushed me towards closure. What I had to do was find better products. We are going to produce ethanol from biomass, we need to consider other feedstocks and better conversion processes.

We have, I think, a well-focused program to try to bring those forward. I do not think a good future is to assume that we can always subsidize ethanol into the liquid fuel market. I think we really have to focus on what technology is going to get us there in a competitive fashion. It is going to take an investment. And we are going to have to sustain the investment at times when oil prices are probably going to go back down.

Senator CONRAD. I appreciate that.

Let me just conclude, if I might, with a question on coal gasification. As you know, we have got the largest commercial-scaled coal gasification plant in the United States in my State. It is a technological marvel. It came on stream under budget. It produces significantly over its nameplate capacity. And it really is a remarkable facility. It gives us some very good indications of what that technology can hold. It gives us also a potential to move into methanol.

In your judgment, is that something that is worth continuing and important for the building of a technological base to continue?

Mr. DAVIS. I really would have to defer on that to other experts within the Department. I will try to answer that for the record.

[The information requested was not received at the time the hearing went to press.]

Senator CONRAD. I appreciate that. Thank you, Mr. Chairman.

The CHAIRMAN. Thank you very much. We appreciate your testimony, Mr Davis.

Next, we have, the schedule calls for two panels. But because of the latest of the hour I think we must combine the two panels. They will include Mr. Richard H. Watson, who is Director of the Washington State Energy Office in Olympia, Washington; Mr. Henry G. Williams, Commissioner of the New York Public Service Commission from Albany; Mr. Gregory M. Reuger, Senior Vice

President and General Manager of Electricity Supply from PG&E in San Francisco; Mr. James Wolf, Executive Director of the Alliance to Save Energy; and Mr. Scott Sklar, Executive Director of the Solar Energy Industries Association from here in Washington.

Gentlemen, welcome to the committee. All of your statements are in the record. I would like for you to focus, if you would, on not what you agree with our statement because we will read that, but the suggestions that you have to make changes.

So, with that, why do not you lead off, Mr. Watson?

STATEMENT OF RICHARD H. WATSON, DIRECTOR, WASHINGTON STATE ENERGY OFFICE, OLYMPIA, WA

Mr. WATSON. Thank you, Chairman Johnston, Senator Wallop, members of the committee.

My name is Dick Watson. I am director of the Washington State Energy Office and the chair of the National Association of State Energy Officials, NASEO. NASEO is an organization of the energy directors of 50 States, territories, and the District of Columbia.

I am pleased to have the opportunity to appear before you today as you consider the National Energy Security Act of 1991, S. 341.

Overall, we believe S. 341 is a positive step in the right direction. In addition the States are encouraged, after many years of ignoring energy problems, the President has focused our national attention on energy policy with the publication of his own energy strategy.

Unfortunately, the National Energy Strategy, while it contains many useful and positive elements, is unbalanced, we believe, to the detriment of energy efficiency and renewable resources. We agree with the sentiments expressed by the Chairman and Senator Wirth and others on February 21st when Admiral Watkins appeared before this committee that a comprehensive energy bill needs to include more in the area of conservation and renewable energy.

During the development of the National Energy Strategy we met with the Department of Energy staff several times, provided them with voluminous information, testified at their hearings, and described in excruciating detail the planning process and programs and successful experiences of the States. Unfortunately, not everything got through.

As Senator Wirth stated at last week's hearing, there are some additions of some elements of the proposed NES that were somehow lost between DOE and the White House. And inclusion of those in a national energy program would be useful.

We believe that the hallmark of the legislation that is finally passed must be one of balance. Incentives for energy efficiency and renewables, both in the form of regulation and financial incentives should be equivalent to those provided for traditional energy production. If the objective is to address market barriers to a needed energy investment, Federal policy should recognize that efficiency and renewable resources face barriers at least as great as those faced by conventional energy development.

We speak directly to several of the provisions of S. 341. In Washington State we have the most aggressive residential energy code in the Nation. And we will soon have the most aggressive commer-

cial energy code as well. We accomplished that working closely with the Federal Bonneville Power Administration.

We believe that the provisions set forth in section 3001 of S. 341 should be passed, especially in the area of public housing.

To assist other States in achieving the cost effective energy savings and environmental benefits of energy codes, we would urge incorporation of the State and local technical assistance provisions contained in section 101 of H.R. 776 introduced by Mr. Sharp.

Section 3002, which would encourage establishment of a voluntary home energy rating system is also an effort we support. We would encourage stronger support of the needed melting of the home energy rating system with an energy efficient mortgage system. A rating system without measures to insure its inclusion in lending decisions are not going to be that effective.

The State supports section 3006, which would create a labeling program for energy efficient windows. We participate on the National Fenestration Counsel as a board member and we believe that setting reasonable consistent standards in this area of rapidly changing technology is essential.

Section 3008 sets forth a labeling program for lamps and illuminaries. Section 403 of the Sharp bill goes further and would require minimum standards that are technologically feasible and economically justified for lamps, appliance motors, small package air conditioners.

We believe that actual minimum standards should be established for lamps and illuminaries, motors, pumps, and small package air conditioners and transformers. The cost effective energy savings there are large. They should be on a fast track and moved as rapidly as possible.

It is a crucial role of the Federal Government to serve as a model of energy efficiency as we help the country move forward. The passage of the provisions of section 3101 of this bill would help. A provision which had been included in the Department of Energy's proposal for the National Energy Strategy, which was deleted by the White House, would have created a $1 billion revolving loan fund to conduct these energy efficiency improvements in Federal facilities.

This builds on several successful programs that have been implemented by the States. We think that we have demonstrated that this sort of a program more than pays for itself. And we believe it should be included in a comprehensive energy program.

Let me speak briefly to the notion of utility incentives. The National Energy Strategy proposed to exclude from taxable income utility rate discounts to consumers for demand-side management programs, incentives, if you will. This in a sense flies in the face of what utilities have learned over the years and that is that utility rate discounts are not terribly effective at encouraging efficiency investment, but that rebates are effective.

We believe the provision should go further and allow direct payments to customers to be excluded from taxable income. This program should be expanded to include water conservation programs as proposed in the legislation introduced by Senator Symms and Representative Kennelly. This expanded provision should be included in S. 341.

With respect to Title IV, Renewable Energy, again, this is a very positive step in the right direction. The joint ventures included in section 4101, including biofuels, geothermals, solar water heating, and a variety of other technologies are very positive provisions.

For example, in the biomass gasification area, the State energy offices in Vermont, in Iowa, have been working with Brazil and General Electric to promote this technology. A number of State efforts in these areas need to be expanded and supported.

Overall, statutory provisions need to be crafted which will provide Federal funding to permit expanded joint ventures with States and industry in renewable energy and energy efficiency areas.

We also support the extension of the renewable investment tax credit, which the administration supports in the NES. In addition, however, we would encourage the committee to provide supplemental stimulus by developing a back-end renewable energy production credit as proposed by the Department of Energy of 2.5 cents per kilowatt hour. This has been included in H.R. 780 introduced by Mr. Sharp.

We would encourage, as Senator Wellstone suggested, that we also give careful consideration to this concept of an investment tax credit for efficiency production as well. In many States we are now conducting bids for demand-side resources, which require that we verify the production of efficiency investments. If we can do it there. We can do it in this area as well.

Title IX, the transportation and alternative fuels area, was outside my purview. But let me make just a couple of quick observations. NASEO certainly supports improvements in the CAFE standards. And we support the alternative fuel provisions included in your bill.

We would encourage you to consider not only improvements to the technology, but also what Federal policy does to subsidize our reliance on the single-occupancy automobile. For example, tax allowances for employee parking are a direct incentive to use a single-occupancy automobile, whereas the incentives which are allowed for mass transit, high-occupancy vehicle uses and other alternatives are quite limited. We would hope that you would examine this as you move forward on this legislation.

In conclusion, let me say that S. 341 is an important and comprehensive piece of energy legislation. It moves in the direction of a balanced approach which the administration's NES proposal discusses but does not quite achieve. We are encouraged that, with some modifications that we have proposed and those which you are discussing, comprehensive legislation that incorporates equivalent incentives for all types of supply sources and demand-side sources can be passed.

The State energy offices look forward to working with you in this important endeavor.

Thank you.

[The prepared statement of Mr. Watson follows:]

PREPARED STATEMENT OF RICHARD H. WATSON, DIRECTOR, WASHINGTON STATE ENERGY OFFICE

INTRODUCTION

Chairman Johnston, Senator Wallop, Committee members, I am pleased to have the opportunity to appear before you today as you begin to consider the "National Energy Security Act of 1991" (S. 341). As requested, I will primarily address my comments to Titles III and IV of this legislation dealing with Energy Efficiency and Renewable Energy.

I am the Director of the Washington State Energy Office and Chairman of the National Association of State Energy Officials (NASEO), and I am testifying on behalf of NASEO. NASEO is an organization composed of energy officials in 50 states, territories and the District of Columbia, and we are committed to promoting a balanced national energy strategy.

Overall, we believe that S. 341 is a positive step in the right direction. While there are areas in which we would urge modifications, the mere existence of this bill is a credit to this Committee. In addition, the states are encouraged that after many years of neglect the President has focused the national attention on energy policy with the publication of his own strategy. Unfortunately, the National Energy Strategy (NES), unveiled by the Administration last week, is unbalanced to the detriment of energy efficiency and renewable resources. We agree with the sentiments expressed by Chairman Johnston, Senator Wirth and others on February 21, when Admiral Watkins appeared before the Committee, that a comprehensive energy bill needs to include more in the area of conservation and renewable energy.

The states understand the need for balance and for comprehensive energy policies. The Department of Energy and the federal government have been inactive, except when prodded by this Committee, your House counterpart, and the Appropriations Committees. In contrast, the states have moved ahead in developing innovative energy programs. We generally believe we know what works and what does not work because we have implemented actual programs. We like to think we are "where the rubber meets the road." I am pleased today to appear with Hank Williams of the New York Public Service Commission. NASEO's Integrated Resource Planning Committee and NARUC's Energy Conservation Committee have been working closely together. We hope that this provides a unique perspective in evaluating these legislative proposals.

Finally, during the development of the NES we met several times with DOE officials, provided them with voluminous information, testified at their hearings, and described in excruciating detail the planning process that many of the states have been through. We think S. 341 and the NES move in the right direction, but do not go far enough. As Senator Wirth stated in last week's hearing, additions of some elements of the proposed NES that were inadvertently lost between DOE and the White House will be very useful. As the Department of Energy stated in their Interim Report—National Energy Strategy, at 4 (April 1990): "The loudest single message was to increase energy efficiency in every sector of energy use. Energy efficiency was seen as a way to reduce pollution, reduce dependence on imports, and reduce the cost of energy." The final version of this bill should reflect that message.

We hope the hallmark of the legislation that is finally passed this year is one of balance. Incentives for energy efficiency and renewable energy should be equivalent to those provided for traditional energy production. If the objective is to address market barriers to energy investment, federal policy should recognize that efficiency and renewable resources face barriers at least as great as those faced by conventional energy development.

One other hallmark should be consistency in federal policy. While we at the state level have been pushing for a sensible energy policy for many years and implementing a number of programs, the Administration has ignored this area for a decade, until the last 18 months. As John H. Gibbons, Director of the Office of Technology Assessment, stated, in testimony before the House Subcommittee on Energy and Power last week, "We will succeed in easing U.S. oil import dependence only if we establish long-term efficiency and supply goals, and stick to the plan to achieve those goals through periods of both crisis and calm, and through periods of high and low oil prices."

The states hope that if the Persian Gulf conflict ends quickly, which we all hope it does, that the Administration and Congress will not forget the process you have started, and see it through.

TITLE III—ENERGY EFFICIENCY

The building energy efficiency standards set forth in Section 3001 of S. 341 should be passed, especially in the area of public housing. We would urge incorporation of the state and local technical assistance provisions contained in Section 101 of H.R. 776, introduced by Mr. Sharp, including the authorization language. Washington State, working closely with the Bonneville Power Administration, has been among the leading states in pushing for comprehensive and enhanced building energy efficiency standards. Last year we passed state legislation to expand this program, and the federal government can provide a useful model to other states and regions drawing upon state efforts.

Section 3002, which would encourage the establishment of voluntary home energy ratings systems, is also an effort we support. Last year, NASEO testified in support of S. 1355, introduced by Senator Bumpers. We believe that the 12-month deadline in S. 341 is preferable to the 18-month deadline in the Sharp bill. On the other hand, the Sharp bill includes provisions which would provide stronger support for the needed melding of a Home Energy Ratings System (HERS) with an Energy Efficient Mortgage Program (EEM). An authorization for appropriations is also important. The establishment of an EEM program in the Cranston-Gonzalez National Affordable Housing Act (P.L. 101-625), passed last year, was a step in the right direction. The provision in the NES in this area is also positive and we look forward to examining the Administration's legislative proposal in detail when it becomes available.

The proposal in Section 3003 of S. 341 to establish a program of joint ventures for improving energy efficiency in energy-intensive industries is a good idea. We encourage the Committee to urge coordination of this effort with state efforts in this area, including the need for real technology transfer of the results of such demonstration projects.

The proposal to require the Secretary of Energy in conjunction with the Council on Economic Advisors, to provide triennial reports on energy efficiency options is also a good idea, so long as it makes recommendations for action and sets forth the analytical basis for such recommendations.

The Section 3005 proposal for voluntary guidelines for energy audits and insulation in industrial plants should be expanded to require consultation with states prior to issuance, rather than limiting such consultation to utilities, industrial consumers and the insulation industry. Again, this is an area where the states have instituted a variety of programs and P.L. 101-440 encourages further activity in this area.

The states support Section 3006 which would create a labeling program for windows and window systems. NASEO participates with a Board member on the National Fenestration Rating Council, and we believe setting reasonable standards in this area is essential.

Section 3007, regarding increased data collection for the Energy Information Administration (EIA), is very important. Many of the states are far ahead of EIA in this area and we will be examining the technical reports and models that DOE has put forward to support the NES to ensure that it was done in an effective manner. After a meeting with state officials in late 1989, DOE representatives visited Sacramento, Albany, Austin and the Northwest Power Planning Council offices to speak with energy officials to examine modeling techniques and end-use data collection. We hope that this information and methodologies have been incorporated into the NES. The data should be released on a regular basis and a separate authorization should be included since end-use efficiency surveys could be labor-intensive.

Section 3008 sets forth a labeling program for lamps and luminaries. Section 403 of the Sharp bill (H.R. 776) goes further and would require minimum standards that are "technologically feasible and economically justified" for lamps, appliance motors and small package air conditioners. We believe that actual minimum standards should be established for lamps and luminaries, motors, pumps, small package air conditioners and transformers. This is critical. It should also be put on a fast-track, with the 36-month limit in the Sharp bill shortened.

Section 3101 would provide necessary changes in the Federal Energy Management Program (FEMP), and would build on the Federal Energy Management Improvement Act of 1988, as well as the Markey Amendment to last year's Defense Authorization bill, establishing an enhanced DOD program. The states have initiated significant programs in building energy efficiency, with numerous energy service company efforts, master-lease financing, bond programs, revolving loans and other innovative techniques to produce energy savings in state and local buildings. If we can assist federal agencies in a formal way, as many states have done informally, we

look forward to helping. For example, Illinois Energy and Natural Resource's Department staff has conducted seminars for GSA on energy efficiency improvements. The forcing mechanism in the Sharp bill, which would prevent agencies from leasing or building new facilities until energy improvements are made, should be added to S. 341. In addition, permitting federal agencies to participate in utility incentive programs is a good provision. Changes in the GSA product schedules and procurement guidelines are also important to encourage acquisition of energy efficient products.

It is a crucial role for the federal government to serve as a model to help the country move forward, and the passage of this provision will help. A provision which had been included in DOE's proposal for the NES, which was deleted by the White House, would have created a $1 billion revolving loan fund to conduct these energy efficiency improvements in federal facilities. We think this is a good idea which would have paid for itself, and is modeled after effective state revolving loan programs.

We are still examining the utility conservation and used-oil recycling provisions, but encouragement of these programs is a positive feature.

In addition, NASEO has long-supported the Territorial Energy Assistance Program in Section 3401 and we continue to do so. The strong interest that the Chairman has shown in this area, with the significant opportunity for use of renewable resources, is to be applauded.

This Committee moved aggressively in the energy efficiency area last year with the passage of the "State Energy Efficiency Programs Improvement Act of 1990" (P.L. 101-440), which was the first statutory update to the federally-supported major state energy programs in a decade. This bill will allow greater flexibility to the states in leveraging funds and permitting more innovative financing techniques for actual projects. It also creates a State Energy Advisory Board to advise DOE on energy policy, especially in the area of efficiency and renewable energy. That Board has yet to be organized and we look forward to rapid action by the Department. The bill also greatly expands the authorization for the Weatherization Assistance Program, the Institutional Conservation Program (ICP or Schools and Hospitals) and the State Energy Conservation Program (SECP). I should also note that NASEO transmitted in mid-January our proposal for regulatory changes to implement the provisions of the State Energy Efficiency Programs Improvement Act. We are hopeful that DOE, with encouragement from this Committee, will issue these implementing regulations quickly.

These programs, and the Energy Extension Service (EES) program, received over a 22% increase in appropriations last year, from approximately $200 million to $247 million. This was the first increase in 10 years. These programs peaked at over $557 million in FY 79, and if they were fully funded at those levels would be well over $1 billion today. Instead, the Administration has once again proposed eliminating federal funding for these programs. Yet, in the NES (e.g., at 8) they talk repeatedly about working with states in these programs, and state:

> "Continue Support of State and Utility Programs. The Department of Energy and other Federal agencies will continue to provide assistance to States and utilities in their efforts to improve energy efficiency in residential and commercial buildings. These efforts include the weatherization of homes occupied by low-income households, the retrofit of institutional buildings, incentives for the purchase of energy-efficient appliances, and a wide range of consumer information programs."

This statement is disingenuous. At the February 21, 1991 hearing, Admiral Watkins attempted to revive the long-standing position taken by OMB that there was an enormous pot of oil overcharge money remaining in state hands to be used for anything under the sun. As the National Consumer Law Center recognized in congressionally-funded studies, this is a myth.

Essentially all the money is allocated to specific projects, almost all is obligated by contract or some other means, and most is spent. For example, many states instituted revolving loan programs, which apparently DOE assumes is money unspent.

We are confident that this Committee and the Appropriations Committee will once again reject this old drumbeat. The simple fact is that these programs provide enormous energy and cost-savings benefits to the American people and Congress knows it. The states are in the forefront in promoting sensible energy programs and this Committee has recognized that fact and has helped to fund these efforts. The federal investment has been, and continues to be, returned many times over. It is leveraged with state funds and private sources to get the most "bang-for-the-buck."

The proposal enacted last year to permit 25% of the Low-Income Home Energy Assistance (LIHEAP) funds to be used for Weatherization was a positive develop-

ment, but the Administration's proposal to slash funding for LIHEAP from $1.6 billion to a little over $900 million is obviously counter-productive.

The simple fact is that the NES is hollow without support for these programs. Funding for the SLAP programs should expand consistent with the authorization levels in P.L. 101-440. In addition, aggressive increases in conservation and renewable energy research and development programs are necessary. DOE has made significant strides in this area and should be congratulated.

The NES proposes to exclude from taxable income utility rate discounts to consumers for demand-side management programs. This provision should go further and allow direct payments to customers to be excluded from taxable income. Many state programs operate in the latter format and are successful. This program should also be expanded to water conservation programs as proposed in the legislation introduced by Senator Symms and Representative Kennelly. Apparently, the IRS opposed this broader provision as the NES was being debated within the Administration, and the option they selected will only require the IRS to issue a so-called Technical Advice Memorandum. This expanded provision should be included in S. 341.

TITLE IV—RENEWABLE ENERGY

Again, this Title is a positive step in the right direction. The duties of the Committee on Renewable Energy Commerce and Trade (CORECT) should be expanded, as set forth in Section 4001 of S. 341. Export of renewable energy technologies is important, and a number of states have established programs in this area, especially California and Massachusetts. We would encourage the Committee to expand this provision to coordinate these activities with the state energy offices, as well. The proposed energy technology evaluation for developing countries established in Section 4003 should also be passed. In addition, the joint ventures proposed in Section 4101, including biofuels, geothermal, solar water heating, photovoltaic, wind, biomass gasification, and fuel cells technology are very positive provisions. For example, in the biomass gasification area, the state energy offices in Vermont and Iowa have been working with Brazil and General Electric to promote this technology. A number of state efforts in these areas need to be expanded and supported.

Overall, statutory provisions need to be crafted which will provide federal funding to permit expanded joint ventures with states and industry in the renewable energy and energy efficiency area, that will help eliminate the bureaucratic barriers in the procurement process to development of these joint ventures. NASEO is working on a project at the present time with DOE and the Solar Energy Industries Association to help stimulate joint ventures. We hope to hold a conference in conjunction with the Urban Consortium's Energy Task Force in the near future to bring together interested parties to promote such joint ventures. Assistant Secretary Davis has been a strong proponent of activities in this area and he should be encouraged. We look forward to working with the Committee and DOE to further develop this concept.

We also support extension of the renewable energy investment tax credit, which the Administration also supports in the NES. In addition, we would encourage the Committee to provide a supplemental stimulus by developing a "back-end" renewable energy production credit of 2.5 cents/kilowatt hour, as proposed in H.R. 780, introduced by Mr. Sharp. This was originally in DOE's proposal on the NES, and should be supported, but not to the exclusion of the investment tax credit.

Other Issues

TITLE XI—TRANSPORTATION AND ALTERNATIVE FUELS

The transportation sector requires enormous attention in order to reduce our usage of petroleum-based fuel and increase energy efficiency. As we all know it is our major problem, and we in the states have been taking the lead, but we need help from the federal government. This bill, and parts of the NES, are a good starting point, but we must pass the Bryan bill.

NASEO supports the "Motor Vehicle Fuel Efficiency Act" (S. 279), introduced by Senator Bryan and strongly supported by Washington State's Senators, Gorton and Adams. This bill will increase fuel economy standards to 40 mpg for passenger automobiles by model year 2001. With our excessive dependence on petroleum in our transportation sector we cannot afford to do otherwise. We believe that this legislation is consistent with the position taken by the National Governors' Association and has the strong support of the states. In an early effort to compromise with the Administration on CAFE, the alternative suggested in S. 341 provides more discretion than is appropriate to the Department of Transportation. Congress should not

wait for the results of the National Academy of Sciences study, which we expect to be delayed beyond June 1, 1991.

The Bryan bill should help stimulate development and use of light-weight engine materials, increase horsepower while limiting weight gains, and other changes that will preserve safety and increase fuel efficiency. We also support the NES proposals to expand research in the area of automotive gas turbines, advanced diesel engines, high-performance batteries, high-performance electric vehicles, high-temperature ceramic materials and friction-reducing technologies.

Another proposal in the NES in the transportation sector is important, and that is the need to fund more research into new aircraft technologies to reduce fuel usage, an effort that is significant to the State of Washington.

The states have long-supported the concept, codified in Section 11017 of S. 341, to stimulate the scrappage of older vehicles. In fact, the program was developed by the California Energy Commission, in conjunction with Unocal, Ford and the South Coast Air Quality Management District. Provision of matching federal funds is a good idea and EPA should permit this type of program to be a control technology for purposes of State Implementation Plans under the Clean Air Act.

Also in this Title of the bill are provisions to stimulate the use of alternative transportation fuels and electric vehicles. This is a necessity, and a clear part of a balanced approach to reducing petroleum usage in the transportation sector. States have been in the forefront of promoting alternative transportation fuels and have worked closely with local governments throughout the country, with recent examples in Arizona, California, Colorado, Iowa, Nebraska, New York, Oklahoma, Pennsylvania, Texas, etc. The recently proposed DOE initiative in electric vehicles, especially the development of new battery technologies in conjunction with EPRI, is also a positive step. The NES has also proposed expansion of the requirement to utilize alternative transportation fuels in smaller fleets beyond the requirements of the Clean Air Act Amendments of 1990, and we support this provision. We also believe that with the federal government's annual purchases of 44,000 light-duty vehicles, with a civilian fleet of 200,000 cars and light trucks, a specific mandate to purchase alternative fuel vehicles is necessary. These large purchases will help drive the market, and will help states and local governments in programs that we are already pioneering. For example, the California Energy Commission has signed important agreements to solve the "chicken and egg" problem in this area, by having major oil distributors agree to provide pumps for alternative fuels. This initiative has been encouraged by other states as well.

A key element of this comprehensive legislation should include the expansion of the "gas guzzler" tax, with a complementary program initiating a "gas sipper" rebate. This will provide an additional stimulus to use of high efficiency vehicles.

The Administration in the NES has proposed expansion of the existing $15 per month benefit of employer-provided mass transit deductions to $20 per month. In order to be truly effective, this benefit should expand to at least $60-$100 per month, should be extended to incentives for car pooling, van pooling and telecommuting and should be coupled with the elimination of the employer-provided deduction for parking. DOE has explained that objections were raised concerning this proposal from the Department of Labor, but the benefits of expanding mass transit usage and reduction of urban emissions is significant. This expanded program should be included in the legislation, and we urge this Committee to actively support amendments to the reauthorization of the Surface Transportation Act to stimulate the use of mass transit and multiple occupancy vehicles, including ridesharing, vanpooling, and HOV lanes.

Telecommuting is also an area that must not be overlooked. In Washington, my office has been promoting the use of telecommuting and providing outreach efforts to businesses to stimulate its use for both the energy-use reduction and the emissions reduction. Contrary to the recommendations in the NES, the barriers to telecommuting are not technological. Telecommuting is entirely feasible with existing technology. The problem is overcoming the resistance of reluctant managers. Tax benefits should be considered in this area, and possibly as control measures under State Implementation Plans.

Another area that deserves examination and research are the potential benefits of providing rebates or vouchers for lower-income Americans to get car tune-ups. With regular tune-ups significant efficiency gains and emissions reductions can be realized, and a stimulus to this activity could be highly beneficial. The state energy offices have been in the forefront of driver education programs for energy efficiency for many years, but there has simply not been enough in the way of resources to do the job adequately.

A comprehensive energy and transportation policy should also include more research in Magnetic Levitation and light-rail technologies and so-called "intelligent" vehicle highway systems. We hope that Congress will direct DOE and the Department of Transportation to work with the states in examining federal and state transportation policies in light of land-use planning and location of work places to maximize energy efficiency and emissions reduction.

TECHNOLOGY TRANSFER

We support the NES focus on technology transfer activities. The work that has already begun has established a new interest in technology transfer, and we look forward to working more closely with the DOE laboratories in disseminating technology they develop and providing feedback from the energy office client groups as to what is needed and what is not. It should be stressed that state energy offices are in regular contact through public information campaigns, audit and implementation programs with all sectors of the economy. This existing technology transfer vehicle needs to be more fully utilized by the federal government. State energy offices, through the use of EES and SECP, promote technology utilization in all types of businesses. This should be encouraged by the Domenici Amendment to P.L. 101-440. Thus far, we have only been able to work with a few labs in certain areas. At our recent Winter Meeting in Washington, D.C. we had encouraging meetings with representatives from the Solar Energy Research Institute and Pacific Northwest Laboratories. We have had longstanding help from the Design Assistance Program of Sandia National Laboratories and extensive work with Argonne. We hope regular communications can be established between the states and the laboratories that will provide a real exchange of ideas. This is essential not only for market penetration of these new technologies but for economic development and international competitiveness reasons. We look forward to working with the Committee to develop language that would help ensure this enhanced communication.

CONCLUSION

S. 341 is an important and comprehensive piece of energy legislation. It moves in the direction of a balanced approach that the Administration's NES proposal discusses but does not achieve. We are encouraged that with some of the modifications we have proposed, and those which you are discussing, comprehensive legislation that incorporates equivalent incentives for all types of supply sources, and demand-side sources can be passed. The state energy offices look forward to working with you in this important endeavor.

I am prepared to answer your questions at this time.

The CHAIRMAN. Thank you very much, Mr. Watson. We appreciate your suggestions on this bill.

And I might say to you and other witnesses, that as we move forward on this legislation, if you have further written suggestions or maybe even written amendments, we would welcome those on the committee.

Next, we will hear from Mr. Henry G. Williams, Commissioner of the New York Public Service Commission.

STATEMENT OF HENRY G. WILLIAMS, COMMISSIONER, NEW YORK PUBLIC SERVICE COMMISSION, ALBANY, NY

Mr. WILLIAMS. Thank you, Mr. Chairman.

I am a victim of mistaken identity this morning, because my name badge identifies me as "Willimas," and the testimony that we submitted, I see my first name is listed as "Henergy." But I will identify myself as a name with which you are more familiar, Mr. Chairman, that is, Hank Williams.

[Laughter.]

Mr. WILLIAMS. Hank Williams is a also a member of the New York Public Service Commission and of the National Association of Regulatory Utility Commissioners. We call it NARUC, and I will be using that acronym as I testify.

I am testifying on behalf of NARUC, which is a nonprofit organization founded 100 years ago, has a membership of government agencies in all 50 States and the District of Columbia and in Puerto Rico, and our chief objective is to serve the public interest by improving the quality and effectiveness of regulation.

My remarks will focus upon titles III and IV, and title XV of S. 341. This legislation is of great importance to the Nation and to State utility regulators, because we believe that we are in a position to take action on many of its provisions.

While we favor increasing our domestic energy supplies, we also believe that we should place more emphasis on energy conservation and energy efficiency. It is difficult to see how this legislation could ignore the overwhelming evidence presented during the National Energy Strategy process that energy conservation and energy efficiency should be one of the important components of a national energy strategy.

S. 341 contains many provisions which encourage energy conservation, and the focus of these provisions appears to be on studies and information dissemination, rather than on measures that would produce real savings. For instance, section 3004 would require the Secretary of Energy to submit a report which sets forth various energy policy options that would decrease our energy consumption as a percentage of GNP through the year 2005.

Many of these policy options have already been identified, and we believe that the time to act on them is now upon us. While measures like energy efficiency labeling can result in marginal improvements in energy efficiency, today's energy situation calls for much stronger methods, such as consumer incentives and minimum efficiency standards for products.

We urge the committee to consider stronger efficiency measures such as minimum standards for lamps, motors and transformers, and for industrial energy use. I would say, parenthetically, Mr. Chairman, that this very day we are meeting in Washington for our winter meetings. This afternoon at 2:30 a representative of the Rensselaer Polytechnic Institute in Troy, New York, is making a presentation on lighting efficiency products that have been developed at that institution, and it may be useful for some of you staff to participate or hear that presentation.

I also visited the General Electric Company's research and development headquarters a couple of weeks ago, and heard General Electric explain a whole family of lighting products that they are now marketing. And these, I think, speak directly to the kind of efficiency improvements that we should foster.

NARUC has a special interest in subtitle C of section 3201, which addresses least-cost utility planning and regulatory incentives for energy conservation. State regulators know that traditional rate-setting procedures provide utilities with a disincentive toward energy conservation, because lost revenues may result in lost profits.

NARUC adapted a resolution some time ago which urges all of our members to take appropriate actions to assure that the successful implementation of a utility's least-cost plan is also its most profitable plan. Utility regulators in more than half of the States

have already adopted or are considering least-cost planning and/or regulatory incentives for energy conservation.

I my own State of New York, for example, we have offered electric utilities financial incentives to undertake energy conservation measures that will benefit their customers. Section 3201(a)(7) requires State regulators to consider a new PURPA standard that would make energy conservation resources as profitable to a utility as investments in new generating facilities.

NARUC does not object to provisions regarding least-cost planning and regulatory incentives, obviously, provided that the statutory authority to State utility regulators is maintained. Section 3201(b) requires the Secretary of Energy to conduct a survey and evaluation of least-cost planning at the State level. What useful purpose would such a survey fill at this time given that the Department of Energy has already done extensive analysis of least-cost planning, and has thoroughly documented its benefits?

We are concerned that such studies would use Federal money that otherwise might be used to help the States to implement, implement least-cost planning and regulatory incentives. Moreover, the requirements of such studies are focused on determining whether least-cost planning will result in high utility rates for electric customers, and not on the total utility system cost savings which are produced by such programs.

We urge the committee to work with our NARUC staff and with NARUC's Energy Conservation Committee, of which I am a member, to refine the language of section 3201. Of course, we support strongly section 3202 of this legislation, which would provide funds to State regulatory authorities to encourage utility investments in demand-side management. This provision would accelerate the development of energy conservation measures.

Section 3002 of the bill would require the Department of Energy in consultation with the Secretary of HUD to develop residential energy efficiency ratings. We support the development of energy efficiency rating systems for residential buildings that are voluntary and that provide States and local governments with maximum flexibility in adapting these systems to their particular conditions.

Unfortunately, the language contained in section 3002 does not appear to provide this degree of flexibility, and we urge the committee to modify the language so that adoption of any rating system is done on a voluntary basis.

Concerning title IV, we generally support the provisions, but we caution that they may have rather limited impact in improving the competitiveness of nonhydro renewable energy vis-a-vis fossil fuels. If a comprehensive energy strategy for the Nation is to be the outcome of this legislation, then renewable energy certainly must be a part of that strategy. Renewables offer the prospect our future growth in electric demand, and can do so in a way that is far less harmful to our environment than many other energy sources.

The national energy strategy document which was released last week calls for legislation that would permanently remove the size cap under PURPA for qualifying renewable energy technologies. And this, of course, is a step in the right direction.

NARUC's commitment to renewable energy resources is also reflected in a renewables report which we prepared with a DOE

grant, and a copy of this, Mr. Chairman, we will make available to members of the committee and your staff. I want to—I see Secretary Davis is still here, and I would like to salute the very cordial and highly productive relationship which my committee and NARUC in general has enjoyed with the Department of Energy in our efforts to develop least-cost planning thinking, integrated resources planning and, particularly, renewables.

This report identifies many of the problems and the barriers that have frustrated renewables in the past, which previous senators and their questions of Mr. Davis was directed. And this report is an excellent first step. I hope that the Department of Energy will see fit to support us in another phase so that we now can convert these important policy lessons into things that are meaningful.

The report points out the renewable energy technologies are making a substantial contribution to our Nation's energy supplies, and a very large, untapped potential remains. And that is where we want to focus. We do not want to jam renewable energy down the throat of the States, but we do want to make sure that the mythology, and some of the mistaken notions, and some of the ignorance that has been associated with attitudes toward renewables is removed, so that renewables can achieve whatever potential they may have in the various States.

Regardless, Mr. Chairman, of the improvements that could be made to title III and title IV, we would still have to oppose the bill due to the preemptive aspects that appear to be contained in title XV, which seeks to amend the Public Utility Holding Act. I understand, Mr. Chairman, that my colleague, Commissioner Ashley Brown of the State of Ohio, and a member of NARUC's—chairman of the NARUC Committee on Electricity is going to be testifying in a couple of weeks on this measure.

By allowing exempt wholesale generators or EWG's to build generation facilities that would not be subject to State regulatory review, efforts to achieve least-cost planning objectives could really be seriously undercut. State regulators would have no authority to review the prudence of utility purchases from these EWG's, thus frustrating the fundamental goal of promoting the adoption of least-cost planning roles by State regulators. Moreover, we believe that the States must be in a position to control the generation mix.

The PUHCA reform proposal seems to fly directly in the face of what is contained in the national energy strategy. The NES calls for the Federal Energy Regulatory Commission to adopt, and I quote, "a policy to make clear that its approval of rates for wholesale power transmission does not prevent a State commission from disallowing recovery of a portion of the rate at the retail level if the State commission determines that the transaction is now consistent with the State's least-cost utility planning program."

In conclusion, Mr. Chairman, we in NARUC are fully committed to working with you and your staff and the members of the committee to improve this legislation, which we believe could certainly a long way toward achieving a comprehensive national energy plan.

Mr. Chairman, appended to my written testimony are a series of resolutions which we have adopted that are pertinent to S. 341. Thank you very much.

[The prepared statement of Mr. Williams follows:]

PREPARED STATEMENT OF HENRY G. WILLIAMS, COMMISSIONER, NEW YORK PUBLIC SERVICE COMMISSION

Mr. Chairman and Members of the Committee:

I am Commissioner Henry G. ("Hank") Williams of the New York Public Service Commission. I am also a member of the Committee on Energy Conservation of the National Association of Regulatory Utility Commissioners (NARUC) on whose behalf I am testifying here today.

NARUC is a quasi-governmental, non-profit organization founded in 1889. Within its membership are the governmental agencies of the fifty States, the District of Columbia, Puerto Rico and the Virgin Islands engaged in the regulation of carriers and utilities. NARUC's chief objective is to serve the public interest by seeking to improve the quality and effectiveness of regulation.

NARUC appreciates the opportunity to comment on Titles III and Subtitles A and B of Title IV of S. 341, the National Energy Security Act of 1991.

This legislation is of great importance to the Nation and State utility regulators, who are in a position to take action on a number of its provisions. State regulatory commissioners have been and continue to be active in the formulation of a national energy policy, as evidenced by our participation in the Department of Energy's National Energy Strategy process. At least one phase of that process was completed with the issuance of the President's National Energy Strategy document on February 20th. NARUC will be commenting on this document and the legislative proposals that will follow.

While we favor increasing domestic energy supplies, we should place renewed emphasis on energy conservation and energy efficiency. An analysis by the Alliance to Save Energy and the American Council for an Energy Efficient Economy concluded that S. 341 would reduce energy use in the year 2000 by only 0.3%. With this in mind, it is difficult to see how this legislation could ignore the overwhelming evidence presented during the NES process that energy conservation and energy efficiency should be one of the important components of a national energy strategy.

Although S. 341 contains many provisions designed to encourage energy conservation, the focus of these provisions appears to be on studies and information dissemination rather than on measures that would produce real savings. For instance, Section 3004 would require the Secretary of Energy to submit a report setting forth various energy policy options that would decrease our energy consumption as a percentage of GNP through the year 2005. Many of these policy options have already been identified in the NES process; the time to act on them has come.

While measures like efficiency labeling can result in marginal improvements in energy efficiency, today's energy situation demands much stronger measures, such as consumer incentives and minimum efficiency standards for products. We urge the Committee to consider some of the stronger energy efficiency measures which other witnesses have suggested, such as minimum standards for lamps, motors and transformers and for industrial energy use. Additional conservation measures could be incorporated from other bills, such as Rep. Sharp's National Energy Efficiency Act (H.R. 776).

LEAST-COST PLANNING PROVISIONS OF TITLE III

NARUC has a special interest in Subtitle C, Section 3201 of the bill, which addresses least-cost utility planning and regulatory incentives for energy conservation. State regulators are well aware that the traditional formula we use in setting rates provides utilities with a disincentive toward energy conservation, as lost revenues may result in lost profits. In fact, NARUC has adopted a resolution urging its member Commissions to take appropriate actions to "ensure that the successful implementation of a utility's least-cost plan is its most profitable plan." The text of this resolution is attached to our written testimony.

Utility regulators in more than half of the States have either adopted or are considering least-cost planning and/or regulatory incentives for energy conservation. In my own State of New York, for example, we have offered electric utilities financial incentives to undertake energy conservation programs that will benefit their customers.

Section 3201(a)(7) of the bill requires State regulators to consider a new PURPA standard that would make energy conservation resources as profitable to a utility as investments in new generating facilities. NARUC does not object to provisions regarding least-cost planning and regulatory incentives, provided the legislation in no way interferes with the statutory authority of State utility regulators. This position

is explained in the attached Resolution on Least-Cost Planning Provision in Global Warming Legislation, which was adopted by the NARUC Executive Committee on July 25, 1990.

Section 3201(b) requires the Secretary of Energy to conduct a survey and evaluation of least-cost planning at the State level. We are not certain what useful purpose the survey and evaluation would fill at this time, given that DOE has already done extensive analysis of least-cost planning and has thoroughly documented its benefits. We are concerned that such studies might simply use up Federal money that otherwise might be used to help States implement least-cost planning and regulatory incentives. Moreover, the requirements of such studies seem focused on determining whether least-cost planning will result in high utility rates for electric customers, and not on the total utility system cost savings produced by such programs.

We urge the Committee to work with our NARUC staff and NARUC's Energy Conservation Committee to refine the language of Section 3201.

We applaud Section 3202 of this legislation which would provide funding to State regulatory authorities to offset the costs of considering measures to encourage utility investments in demand-side management. In this time of fiscal austerity, this provision will undoubtedly accelerate State adoption of policies to encourage conservation. Demand-side management programs are becoming increasingly important to electric utilities, especially as they attempt to meet future load growth while complying with new Clean Air Act emission standards.

We would also like to comment about the provisions contained in Section 3002 of the bill, which would require DOE, in consultation with the Secretary of Housing and Urban Development, to develop residential energy efficiency ratings. As we have stated in a resolution adopted at our 1990 winter meetings and in previous testimony on S. 1355, we would support the development of efficiency rating systems for residential buildings that are voluntary and that provide States and local governments with maximum flexibility in adapting these systems to their particular geographical, economic and social conditions.

Unfortunately, the language contained in Section 3002 does not appear to provide this degree of flexibility, and we urge the Committee to modify the language so that adoption of any rating system is done on a voluntary basis. The type of language that would be acceptable to us is found under Part 7 of H.R. 776.

NON-HYDRO RENEWABLE ENERGY PORTIONS OF TITLE IV

Concerning Title IV of this legislation, the NARUC generally supports these provisions but cautions that they may have rather limited impact in improving the competitiveness of non-hydro renewable energy vis-a-vis fossil fuels. If a comprehensive energy strategy for the Nation is to be the outcome of this legislation, then renewable energy certainly must be part of that strategy. Renewables offer the prospect of meeting our future growth in electric demand and can do so in a way that is far less harmful to our environment.

In fact, I would note that the National Energy Strategy document released last week calls for legislation that would permanently remove the size cap under PURPA for qualifying renewable energy technologies. This new law would apply to generating plants that are selected under State-approved competitive bidding procedures.

NARUC's commitment to renewable energy resources is also reflected in the attached resolution and a report, prepared under a DOE grant, that will be reviewed and considered for adoption by the NARUC Energy Conservation Committee and will be presented to the NARUC Executive Committee at the winter meetings under way in Washington this week. I chair the Subcommittee which prepared the report.

This report identified a number of barriers that face renewables as sources for electric generation. To summarize these four barriers: (1) State commissions do not have a current and reliable database of information concerning renewables cost, potential, and availability; (2) qualifying facility screening, pricing and contracting practices under PURPA undervalue renewable energy resources; (3) utilities are disinterested or skeptical about faster deployment of renewable energy technologies; and (4) expiration or uncertainty about government incentives that support renewable energy resource development.

As the Energy Conservation Committee's renewable report points out, renewable energy resources have demonstrated competitiveness and are making a substantial contribution to the Nation's energy supplies. Unfortunately, a very large untapped potential remains. State regulators have a vital role to play in unlocking this potential. For this reason, the report makes a series of recommendations that could make up a NARUC Renewable Energy Agenda. The details of this agenda are spelled out

in the Committee's report, a copy of which I would gladly provide to your staff. As the next phase of its renewables project, we are drafting a work plan that will assist and encourage regulators in the further development of renewable energy technologies.

PRE-EMPTIVE ASPECTS OF TITLE XV

Regardless of the improvements that could be made to Titles III and IV of S. 341, NARUC would still have to oppose this bill for the pre-emptive aspects contained in Title XV, which seeks to amend the Public Utility Holding Company Act. By allowing exempt wholesale generators or EWGs to build generation facilities that would not be subject to State regulatory review, efforts to achieve least-cost planning objectives would be severely undercut. State commissions would have no ability to review the prudence of utility purchases from these EWGs, thus frustrating the goal of promoting the adoption of least cost planning rules by State commissions. Moreover, NARUC continues to believe that States must be in a position to control the generation mix, as stated in the attached resolution on PUHCA reform.

The PUHCA reform proposal seems to fly directly in the face of what is contained in the NES released last week. The NES calls for the Federal Energy Regulatory Commission to adopt "a policy to make clear that its approval of rates for wholesale power transactions does not prevent a State commission from disallowing recovery of a portion of the rate at the retail level if the State commission determines that the transaction is not consistent with the State's [LCUP] program."

CONCLUSION

In conclusion, the NARUC is fully committed to working with the Committee and its staff to improve this legislation, which we believe could go a long way toward achieving a comprehensive national energy plan—something this country has been lacking too long.

Thank you, and I would be happy to answer any questions that you may have.

[Attachment 1]

RESOLUTION IN SUPPORT OF INCENTIVES FOR ELECTRIC UTILITY LEAST-COST PLANNING

WHEREAS, National and international economic and environmental conditions, long-term energy trends, regulatory policy, and technological innovations have intensified global interest in the environmentally benign sources and uses of energy; and

WHEREAS, The business strategy of many electric utilities has extended to advance efficiency of electricity end-use and to manage electric demand; and

WHEREAS, Long-range planning has demonstrated that utility acquisition of end-use efficiency, renewable resources, and cogeneration is often more responsible economically and environmentally than traditional generation expansion; and

WHEREAS, Improvements in end-use efficiency generally reduce incremental energy sales; and

WHEREAS, The ratemaking formulas used by most State commissions cause reductions in utility earnings and otherwise may discourage utilities from helping their customers to improve end-use efficiency; and

WHEREAS, Reduced earnings to utilities from relying more upon demand-side resources is a serious impediment to the implementation of least-cost planning and to the achievement of a more energy-efficient society; and

WHEREAS, Improvements in the energy efficiency of our society would result in lower utility bills, reduced carbon dioxide emissions, reduced acid rain, reduced oil imports leading to improved energy security and a lower trade deficit, and lower business costs leading to improved international competitiveness; and

WHEREAS, Impediments to least-cost strategies frustrate efforts to provide low-cost energy services for consumers and to protect the environment; and

WHEREAS, Ratemaking practices should align utilities' pursuit of profits with least-cost planning; and

WHEREAS, Ratemaking practices exist which align utility practices with least-cost planning; and

WHEREAS, The substance of this Resolution is reflected by the Resolution of the same Title adopted by the NARUC Executive Committee on July 27, 1989; now, therefore, be it

RESOLVED, That the National Association of Regulatory Utility Commissioners (NARUC) convened in its 101st Annual Convention in Boston, Massachusetts, urges its member State commissions to:

(1) Consider the loss of earnings potential connected with the use of demand-side resources;

(2) Adopt appropriate ratemaking mechanisms to encourage utilities to help their customers improve end-use efficiency cost-effectively; and

(3) Otherwise ensure that the successful implementation of a utility's least-cost plan is its most profitable course of action.

Sponsored by the Committee on Energy Conservation
Adopted November 15, 1989

[Attachment 2]

RESOLUTION ON LEAST-COST PLANNING PROVISION IN GLOBAL WARMING LEGISLATION

WHEREAS, A Least-Cost Planning amendment to the Public Utility Regulatory Policies Act (PURPA) has been included in the legislation that addresses global warming; and

WHEREAS, This amendment creates a new ratemaking standard under Section 111 of the PURPA that would require State utility commissions to consider making utility investments in demand-side management (DSM) as profitable as investments in new generation facilities; and

WHEREAS, The bill containing this amendment, S. 324, is pending before the United States Senate after having been passed by the Committee on Energy and Natural Resources, and the National Association of Regulatory Utility Commissioners (NARUC) has never taken an official position on this bill; and

WHEREAS, The majority of State utility commissions have taken steps to encourage utilities to pursue Least-Cost Planning and DSM strategies, and have in many instances incorporated Least Cost Utility Planning and Integrated Resource Planning into the State-ratemaking process; now, therefore, be it

RESOLVED, That the Executive Committee of the National Association of Regulatory Utility Commissioners (NARUC) assembled at its 1990 Summer Committee Meeting in Los Angeles, California, finds that the new ratemaking standard cited above should encourage but not restrict the States' ability to fashion appropriate incentive programs for DSM by electric utilities; and be it further

RES0LVED, That the Executive Committee of the NARUC supports rewarding DSM efforts by utilities, but the extent and form of such incentives should remain the province of State regulatory commissions.

Sponsored by the Committee on Electricity
Adopted July 25, 1990

[Attachment 3]

RESOLUTION IN SUPPORT OF RESIDENTIAL ENERGY EFFICIENCY RATINGS SYSTEMS

WHEREAS, A national home energy efficiency ratings system will have conservation benefits, expand the pool of affordable housing, and have a positive impact on the greenhouse effect and global warming; and

WHEREAS, Pilot uniform, voluntary, nonprofit energy efficiency ratings systems are now being successfully implemented in Rhode Island, Arkansas, Vermont, Alaska, Mississippi, and Washington; and

WHEREAS, These pilot efforts are operated by nonprofit entities and were developed through the voluntary cooperation of lenders, mortgage insurers, real estate professionals, appraisers, and builders, with the support of State energy offices, often utilizing oil overcharge funds; and

WHEREAS, A number of entities are capable of performing unbiased, objective ratings of total annual utility costs, including space heating and cooling, HVAC equipment and water heating efficiencies, lights, and appliances; and

WHEREAS, Federal support is essential for the establishment of similar programs in all 50 States and the District of Columbia; and

WHEREAS, S. 1355, sponsored by Senators Dale Bumpers (D-AR) and James M. Jeffords (R-VT) would direct the Secretary of Energy to: (1) select a qualified residential energy ratings organization to develop a ratings system in consultation with participants in the residential shelter industry, energy conservation officials and

others; (2) set standards for State energy rating organizations; (3) provide training and technical assistance; (4) maintain a national residential energy efficiency data bank; and (5) authorize Federal funds to support theses efforts for four years, after which time the organization is intended to be self-sufficient; now, therefore, be it

RESOLVED, That the Executive Committee of the National Association of Regulatory Utility Commissioners (NARUC) assembled at its 1990 Winter Committee Meeting in Washington, D.C., requests the Secretary of Energy and the President of the United States to include a national home energy efficiency ratings system with the attributes described herein in the National Energy Strategy now being developed; and be it further

RESOLVED, That the Executive Committee of the NARUC urges Congress to enact legislation to authorize and appropriate funds to promptly implement a voluntary, home energy efficiency ratings system in all fifty States and the District of Columbia.

Sponsored by the Committee on Energy Conservation
Adopted February 28, 1990

[Attachment 4]

RESOLUTION REGARDING RENEWABLE ENERGY

WHEREAS, Measured and prudent preparations for foreseeable risks are far more efficient and less disruptive than actions and reactions taken in response to crisis; and

WHEREAS, Our economy's growing dependence on foreign nonrenewable energy sources places our nation's political and economic security at the risk of events and markets over which we have less and less control; and

WHEREAS, Renewable energy technologies provide a secure buffer to our national economy and its constituent consumer groups because of renewables' inherent relative immunity to fuel cost increases or politically motivated embargoes; and

WHEREAS, The current reliance on many of our nonrenewable energy supplies is not sustainable even for the lives of our children; and

WHEREAS, Many renewable energy technologies have the potential to be planned and implemented flexibly in incremental units to quickly match demand growth, and will add to our supply diversity; and

WHEREAS, As environmental concerns increasingly influence energy policy, renewable energy technologies can, and will increasingly supply a growing global demand for clean energy, which presents an opportunity for American industry to export technology and skills; and

WHEREAS, State public utility commissions can utilize life-cycle costing methods in procurement decisions, can require utilities to compare the cost of central station nonrenewable sources and grid extension to central station renewable stand alone and hybrid renewable energy technologies, can offer incentives for utility investment in renewable energy technologies, skills acquisition and delivery systems, and can take other actions to encourage or support greater use of renewable energy resources; now, therefore, be it

RESOLVED, That the Executive Committee of the National Association of Regulatory Utility Commissioners (NARUC) assembled at its 1990 Summer Committee Meeting in Los Angeles, California, acknowledges that renewable energy technologies will contribute increasingly to the Nation's energy supply; and be it further

RESOLVED, That the Executive Committee of the NARUC urges the Department of Energy to: (a) give properly increased recognition to the potential of renewables in the formulation of the National Energy Strategy; and (b) increase its attention to the technical, institutional and economic constraints which limit the contributions which renewable energy technologies can make to the Nation's energy requirements.

Sponsored by the Committee on Energy Conservation
Adopted July 26, 1990

[Attachment 5]

RESOLUTION ON REFORM OF THE PUBLIC UTILITY HOLDING COMPANY ACT

WHEREAS, Legislation is pending before the Senate Committee on Energy and Natural Resources, S. 406, to amend the Public Utility Holding Company Act of 1935 (PUHCA); and

WHEREAS, The legislation would create a new category of electric generator called Exempt Wholesale Generators (EWGs) which would not be subject to the regulatory restrictions imposed on holding companies by PUHCA; and

WHEREAS, The purpose of this bill is to greatly reduce the barriers to entry for holding companies, including electric utilities, to enter wholesale markets and sell power to distribution utilities for resale to consumers; and

WHEREAS, The addition of new EWGs to wholesale markets subject to regulation by the Federal Energy Regulatory Commission (FERC) will erode State control of an increasingly large percentage of the cost of electrical service, particularly if the FERC and the Federal Courts continue to hold, in reliance on *Mississippi Power & Light* v. *Mississippi ex rel. Moore*, 487 U.S. —— (1988), that State commissions have severely limited jurisdiction to review the passthrough of purchased power costs in retail rates; and

WHEREAS, By permitting unrestricted utility ownership of EWGs, the legislation creates the opportunity for utilities to cross-subsidize their construction and operation of wholesale power facilities through their retail distribution rates, particularly utilities owning and operating EWGs which sell power to affiliated distribution companies; and

WHEREAS, The substance of this Resolution is reflected by the Resolution of the same Title adopted by the NARUC Executive Committee on July 27, 1989; now, therefore, be it

RESOLVED, That the National Association of Regulatory Utility Commissioners (NUC), convened in its 101st Annual Convention in Boston, Massachusetts, strongly opposes amendment to the Public Utility Holding Company Act of 1935 unless provisions are included which specifically preserve the legal authority of the respective State commissions to insure that the sale of power by new entrants into wholesale markets is in the interest of retail ratepayers. Such provisions must:

(1) Ensure the right of each State commission to review the prudence of the wholesale purchasing practices of each distribution utility subject to the State commission's authority; and

(2) Preserve the right of each State commission to conduct bidding programs and least cost planning; to determine the appropriate mix of generation, as a matter of fuel and technology choice and as a matter of ownership; to take actions to insure system reliability; to restrict or prohibit affiliate transactions; and to approve or disapprove the transfer of assets from a utility to another party, free from preemption under Federal statutes or the Commerce Clause; and

(3) Provide a right of access, enabling State commissions to review the books and records of holding companies and all holding company subsidiaries, including non-regulated businesses that transact business with the retail distribution company or EWG entity; and

(4) In the case of an integrated multi-State utility holding company, authorize regional compacts for those States who have jurisdiction over retail subsidiaries of the holding company for the sole purpose of regulating the allocation of costs and/or the prudence of wholesale power purchases by the holding company.

Sponsored by the Committees on Electricity, Energy Conservation,
and Finance and Technology
Adopted November 15, 1989

The CHAIRMAN. Thank you very much, Mr. Williams.

Next, we will hear from Mr. Gregory M. Reuger, Senior Vice President and General Manager of Electric Supply for PG&E.

STATEMENT OF GREGORY M. REUGER, SENIOR VICE PRESIDENT AND GENERAL MANAGER, ELECTRIC SUPPLY, PACIFIC GAS & ELECTRIC, SAN FRANCISCO, CA

Mr. REUGER. Mr. Chairman and Senator Wallop, I appreciate the opportunity to speak with you this morning concerning a topic of

vital importance, the Nation's energy policy. As you mentioned, I am the senior vice president in charge of electric supply at Pacific Gas and Electric, which is the Nation's largest privately held combined gas and electric utility.

In the brief time we have had to review both the President's National Energy Strategy and the National Energy Security Act, we have found many initiatives that we strongly support. However, it appears to us that the strategy is missing some major opportunities in the critical areas of energy efficiency and renewable energy sources, the topics before us here today.

I would like to emphasize from the start that improving energy efficiency and moving towards environmentally preferred renewable energy supply sources can play a major and, in many parts of the country, dominant role in our energy future. PG&E is committed to such a future. I say this as an engineer with many years of experience in the power generation field, and as a utility executive whose primary responsibility is to ensure that PG&E can deliver the electric energy our customers will need in the future.

The energy demands of northern and central California, our service territory, are growing at over 2 percent per year to fuel the industry and agriculture of a region which by itself would represent the thirteenth largest economy in the world. This growth, unabated by new energy efficiency gains, will require us to deliver 25 percent more energy to our customers in the year 2000 than we did in 1990. We believe this growth can be met through the aggressive pursuit of efficiencies alone, customer efficiencies, efficiencies in PG&E's generating system, and efficiencies on a regional basis in how we operate.

In customer energy efficiency, PG&E will spend close to $2 billion over this decade. We intend to cut our energy growth by half and our peak demand growth by 75 percent, or 2,500 megawatts, over this decade, and that, at an average cost of 3 to 4 cents per kilowatt hour, which is less than half the levelized cost of building new fossil generation to meet this need. Given today's proven energy efficiency technologies, we are confident that we can deliver the energy savings we need while our customers enjoy full energy satisfaction without any compromises.

What about the future beyond this decade? Like many other utilities, we will need significant new supply side resource additions early in the next century, even with aggressive customer energy efficiency programs. This is where renewables come in. Let me make a bold statement: Proven technologies exist today that would allow a State like California with abundant natural resources like good solar insulation to meet all of its energy needs through renewable energy technologies.

PG&E already obtains 47 percent of its energy in an average water year from renewable technologies, hydropower, geothermal, biomass, wind, and solar. The new energy sources in this group, wind and solar, are just starting to come into their own. Technically, solar, wind, and other nontraditional energy technologies are feasible today; however, these technologies require continued improvement and learning curve experience to reach cost levels that can compete with more traditional generation technologies.

Some emerging renewable technologies like wind generation, for example, are very close to full cost competitiveness today. PG&E, working together with the Electric Power Research Institute and U.S. Windpower, is working on the commercial development of a third generation, 300-kilowatt, variable-speed wind turbine that looks like it will be able to deliver energy in good wind areas at a life cycle levelized cost of between 5.5 and 6.5 cents per kilowatt hour. That is comparable to the cost of combined cycle gas technologies, which are our best fossil option today.

We have seen dramatic cost reductions in other emerging renewable technologies as well. Most are still about 20 percent more expensive over their lives than alternative fossil fuel generation options. If our Nation continues to provide the incentive for development, many may reach price competitiveness by the turn of the century.

Now, let me turn to the role I see for the Federal Government in supporting the development and use of both energy efficiency and renewables as key components of this Nation's energy future. You may ask, if energy efficiency is already cost-effective and comparative with other power sources, why are more people not doing it? And if it is so great, why is government action needed to support its adoption? The answer is market impediments.

Energy efficiency technologies have developed faster than consumer awareness. Many of the technologies are cost effective over a pay-back period which is too slow for the average consumer, but appropriate for the longer-term prospective of utilities and society. Many utilities operate within regulatory frameworks today which discourage investment in energy efficiency by rewarding only energy sales.

Senate bill 341 appropriately deals with many of these impediments. On the specific points of S. 341, PG&E supports the broad elements of title III, but we do not think it goes far enough to secure the benefits of energy efficiency that are technologically and economically available today, or pushes toward even more economic energy efficiencies tomorrow.

PG&E supports subtitle A, section 3003, which encourages efficiency R&D and joint ventures for energy-intensive industries. But it should also be expanded to include joint ventures and efficiency demonstrations for commercial and residential energy use.

PG&E strongly supports subtitle B of title III, which would require Federal agencies to install efficiency improvements with payback periods of 10 years or less, but while applaud the establishment of a $50 million fund for these Federal projects, the budget amount should be significantly increased to capture more of the cost-effective opportunities that exist within Federal buildings.

PG&E supports subtitle C, which would amend the Public Utility Regulatory Policy Act of 1978 to require State consideration of incentive mechanisms for utilities that undertake efficiency programs and promotes least-cost planning at the State level. We are encouraged that these measures recognize the important role of utilities in determining market-base energy policy, and that they respect the need for flexibility to meet State and utility circumstances with creative, appropriate solutions.

Although 341 does not address the issue of taxing utility rebates, PG&E recommends this committee work to eliminate the taxation of rebates paid by utilities to purchasers of energy efficient equipment. This taxation raises the effective cost of energy efficiency and lowers its attractiveness to the consumer.

PG&E urges this committee to promote legislation that would exclude utility rebates from taxable income. The solution proposed in the National Energy Strategy does not fully solve this problem. My written testimony explains why in some detail.

Now, turning to renewables, S. 341 seems to look at new renewables, wind, central solar, biomass, photovoltaics, as being only viable over the next few decades for deployment overseas in underdeveloped countries where well-developed interconnected electric systems do not exist. That is an erroneous assumption.

Though PG&E supports continuation of the CORECT programs outlined in your bill, we urge more domestic front support as well. We see a need for government action to speed the demonstration and commercialization of these technologies in the same way that it promoted the development of nuclear and clean coal technologies in past decades.

Renewable technologies can become fully competitive relatively quickly if two types of actions are taken. First, we need to step up the push these technologies can receive to move more quickly up the learning curve to commercialization, something we call "technology push." Second, we need to jump-start the market for applications of these technologies to speed their adoption, or what we could call "market pull." Federally supported research development and demonstration projects with a major emphasis on joint venture funding will contribute significantly to this process.

Temporary production incentives for renewables should also be considered. Many renewable technologies depend upon the economies of mass production rather than the economies of scale. Learning curve cost reductions through early deployment are crucial, particularly for the types of technologies we are looking at here.

The need for greater attention to renewable and environmentally clean technologies is demonstrated by the proposed 1992 Department of Energy R&D budget. With a $7.4 billion total, only 3 percent is directed to renewable energy technologies; 4.4 percent is dedicated to the most immediate and promising energy source, energy efficiency, and 81 percent is directed to uranium supply, fission, fusion, and nuclear waste.

While we fully support all efforts to deal with the nuclear waste problem in the development of advanced nuclear technologies, we believe that the Department of Energy needs to enhance or reprioritize its research and, most importantly, joint venture demonstration efforts to address the promising area of renewables.

In conclusion, we believe that S. 341 represents important and needed progress towards a well-balanced least-cost energy strategy for the United States, but more can and must be done. Energy efficiency in renewable energy technologies represent tremendous opportunities for the made-in-America energy independence we seek. They should be core parts of our National Energy Strategy.

Thank you.

[The prepared statement of Mr. Reuger follows:]

TESTIMONY OF GREG M. RUEGER
SENIOR VICE PRESIDENT AND
GENERAL MANAGER - ELECTRIC SUPPLY
PACIFIC GAS & ELECTRIC COMPANY

BEFORE THE UNITED STATES SENATE COMMITTEE
ON ENERGY AND NATURAL RESOURCES
REGARDING TITLES III AND IV OF THE
NATIONAL ENERGY SECURITY ACT OF 1991
CONCERNING ENERGY EFFICIENCY AND RENEWABLE ENERGY

TUESDAY, FEBRUARY 26, 1991

Mr. Chairman and members of the Committee, as a representative of a major energy company, I appreciate the opportunity to speak with you this morning concerning a topic of vital importance -- the nation's energy policy. I am the Senior Vice President in charge of Electric Supply at the Pacific Gas and Electric Company (PG&E), which is the nation's largest privately held combined gas and electric utility. Our revenues exceed $9 billion per year, and we serve 11 million Californians from the Oregon border to Santa Barbara. We have well over 100 years of experience in the energy arena and a reputation of being an industry innovator. We take pride in our long history of providing high quality, reliable energy service to this important and fast-growing region, and we intend to continue our tradition of dependable energy service.

Setting forth an energy strategy that our nation's citizens, businesses and government servants can rally behind is crucial to our future. That fact has certainly been underscored by the ongoing events in the Middle East and the global debates we are experiencing related to energy sources and their impact on our environment. We applaud both the Administration's and your Committee's efforts to develop the strategy we need -- one that recognizes the energy realities we face today, that is a dependence on fossil fuels, but takes significant steps towards breaking that dependence and leading us to a more sustainable and secure non-fossil future.

In the brief time we have had to review the President's National Energy Strategy, we have found many initiatives that are "right on." Nonetheless, we feel strongly that the strategy is missing some major opportunities in the critical areas of energy efficiency and renewable energy sources, the topics before us here today. Your proposed National Energy Security Act provides stronger actions in these areas, but much more can and should be done.

In this morning's remarks, I would like to emphasize from the start that improving energy efficiency and moving toward environmentally preferred renewable energy supply sources can play a major, and in many parts of the country, dominant role in our energy future. Energy efficiency technologies are unquestionably a reality today. Many renewable generation options are technically feasible today, and with encouragement can prove to be fully cost competitive options for major deployment in natural resource rich regions like California within ten years. However, making this future a reality will require effort and commitment from utilities, regulators and legislators.

To establish my credentials, let me share with you our experience with energy efficiency and renewable resource technologies.

- Energy Efficiency - For years, PG&E has been pursuing efficiencies as an integral part of our energy supply strategy. Our experience includes construction of the Pacific Intertie Transmission system in the 60's to capture regional generating efficiencies, earning Presidential recognition of our conservation efforts in the 70's, and working collaboratively with environmentalists, consumer advocates, and regulators to push California into the customer energy efficiency lead in the 90s.

  Over the last 15 years, PG&E has invested $1.5 billion in energy efficiency measures, avoided 1,800 megawatts of new power plant construction and saved our customers over $3.5 billion.

- Resource Availability - PG&E has been the nation's leader in the use of renewables and alternative non-fossil-fueled generation technologies. Close to 60 percent of our 1990 energy needs were met through non-fossil sources, despite continuing drought conditions limiting hydroelectric generation. We operate the nation's largest investor-owned hydro system and the world's largest geothermal generation facilities. We have been a leader in the development of solar and wind technologies -- over 50 percent of the world's wind energy is generated within PG&E's service area, and we have an internationally respected program to develop photovoltaic and other forms of solar energy. Nuclear and natural-gas fired fossil generation round out what is one of the environmentally-cleanest electric systems in the world.

LOOKING TO THE FUTURE

The energy demands of northern and central California are growing at over 2 percent per year, to fuel the industry and agriculture of a region with the 13th largest economy in the world. This growth will require us to deliver 25 percent more energy to our customers in the year 2000 than we did in 1990. PG&E's strategy to meet that growth in demand can be summarized in three words: efficiency, renewables, and competition.

Through the 1990s, PG&E's electric energy growth needs can be met through the aggressive pursuit of efficiencies -- improvements in customer energy efficiency, PG&E's existing generating system efficiency, and regional operations efficiency. We are committed to this approach and are putting our investments where our mouth is to prove it. In customer energy efficiency, PG&E will spend close to $2 billion over this decade. We intend to cut our energy growth by half and our peak demand growth by 75 percent (2,500 megawatts) at an average cost of 3 to 4 cents per kilowatt-hour -- less than half the levelized cost of building new fossil generation. And given today's proven energy efficiency technologies, we are confident that we can deliver the energy savings we need while our customers enjoy full energy satisfaction without any compromises.

What about the future beyond this decade? Like many other utilities, we will need significant new supply-side resource additions early in the next century. Although our aggressive customer energy efficiency programs will continue to be the mainstay of our strategy well beyond the '90s, electric loads will continue to grow beyond our ability to offset them through

efficiency measures, and our existing generation system will need replacement due to advanced age. This is where renewables and competition come in.

Let me make a bold statement. Proven technologies exist today that would allow a state like California, with abundant natural resources (good solar insolation and so on) to meet all of its energy needs through renewable energy technologies. Technically, solar, wind and other non-traditional energy technologies are feasible today. However, these technologies require continued improvement and "learning curve" experience to reach cost levels that will support wide-spread, large-scale deployment. Although renewable technologies like wind are very close to full cost-competitiveness, most renewable technologies are about 20 percent more expensive today (on a life cycle basis) than alternative fossil-fueled generation options. But if the speed of technological advance continues as in recent years, they may reach price competitiveness by the turn of the century.

The third element of our strategy involves competition. Though PG&E will undoubtedly invest in new generating facilities of its own in the future, we expect to be a major purchaser of power from the independent energy community. Competition can benefit our customers if the power comes from the widest possible array of suppliers, selling power at fully competitive prices, with timing and controllability that truly meet utility needs. Legislative and regulatory changes will be needed to foster this true competition.

Each of the three key points of PG&E's electric supply strategy are addressed in sections of the National Energy Security Act, the subject of this series of hearings. As today's hearing focuses on Energy Efficiency and Renewable Energy, so do my remarks here. PG&E will be submitting separate written comments on other parts of the legislation for inclusion in the appropriate record.

The National Energy Security Act can pull the nation into an era of environmentally preferred customer energy efficiency and significantly reduce our national dependence on fossil fuels. To do so, however, the legislation must be strengthened in a way that supports Senator Wallop's statement that, "... fundamental to the success of any rational energy strategy is that it be sufficiently flexible for all domestic energy supply and demand alternatives to compete in the market place." Reducing market barriers, fostering advancements in technology and providing appropriate incentives can allow the marketplace to act as the arbiter of energy supply and demand decisions.

ENERGY EFFICIENCY

PG&E has managed the nation's largest utility-run energy efficiency program for more than a decade. We have offered energy efficiency services to virtually every class of customer. These programs have reduced customer bills by more than $3 billion; they have saved 4.5 million therms of natural gas; and they have reduced the need for new electric generating capacity by 1,800 megawatts (the equivalent of several major power plants). Despite these accomplishments, energy efficiency remains the largest untapped resource available to us, as is reflected in PG&E's overall supply strategy.

Though the efficiency goals we have set for ourselves in the next decade are aggressive, they are modest in comparison to many estimates of the technical potential. By the year 2000 our efficiency investments in the 1990s will yield a demand reduction of 2,500 MW, representing approximately 14 percent of our current total electricity demand and 75 percent of projected load growth. As your Committee is probably aware, the estimates of technical potential for reducing U.S. electricity consumption range from a conservative 25 percent to more than 75 percent of total current use. Whichever end of the range you think is likely, this represents a huge potential that should be captured as an element of our nation's energy strategy.

PG&E's lengthy experience with energy efficiency has shown that pervasive barriers to an effective and efficient marketplace exist which will prevent us from capturing this full potential, however. Achieving parity between supply and demand options in the market will require significant and concerted efforts by federal and state legislators, utilities, private-sector producers and consumers, and other key groups.

MARKET BARRIERS TO ENERGY EFFICIENCY

PG&E has identified the following barriers to market acceptance of energy efficiency:

Lack of customer information and knowledge: Most of our customers, particularly residential and smaller commercial customers, lack convenient access to credible and complete sources of information about their energy choices. Information on efficient technologies, to the extent it is available, is often more technical than customers readily understand, or comes from sources viewed as biased. In addition, a customer cannot see electricity consumption and cannot tell how her appliance and usage patterns affect the total, or what equipment or energy practices offer the greatest opportunity for efficiency or cost savings.

Lack of trained technicians: Energy efficiency considerations are not highlighted in the training of most engineers, architects, mechanics, operations personnel and service technicians. Information and training about the rapid advance of efficiency technologies is particularly underfunded, and only occasionally available.

Underdeveloped distribution networks: Retail availability of many of the most efficient technologies is poor. Retailers are stuck with the "chicken or the egg" dilemma -- they cannot afford to stock the most effective, efficient equipment because there is limited demand for it, and demand cannot grow because consumers can't learn about or find the best products.

Risks for Producers: The introduction of new products is often a slow process in any market, particularly where the service being provided is already well supplied and considered essential. Market research done by the Electric Power Research Institute has shown that customers are reluctant to try new variations on currently effective technologies (such as refrigerators), so the new technology languishes. Our own experience in marketing efficiency programs confirms this finding.

In addition, the risks of new product development are particularly high in certain consumer-product sectors. The refrigerator market, for example, is a mature industry in which customers are not willing to take risks for energy efficiency and in which strong competition makes the risks of product failure particularly high. The effect of these risks on manufacturers chills their interest in research or promotion of more energy-efficient technologies.

Separation of Buyer from User: Most construction of new homes and businesses is carried out by developers whose primary interest is low first cost, because buyers place higher value on features other than energy efficiency. In the office and home rental markets (especially in apartment buildings), the person who purchases equipment is generally not the same person who pays for the energy consumption.

Financial: Many customers lack ready access to the capital or financing necessary when energy-efficient equipment is more expensive than the alternatives. Even in industries where capital is available, management generally prefers to invest in production-related improvements rather than in cost-saving equipment.

Regulatory: Within the utility industry, there is a long-standing regulatory bias toward supply investments. Not only are most utilities rewarded solely for their investments in new production facilities, but ratemaking generally makes utilities averse to customer efficiency improvements because reduced consumption can actually lower revenues and profits. Even when a utility is willing to integrate supply and efficiency investments to meet future customer needs at least cost, traditional regulatory practice must still be adjusted to ensure that the utility's shareholders do not suffer as a result.

ROLES

Energy efficiency cannot make a significant impact on energy use unless these barriers are significantly or wholly diminished. PG&E believes that no one party can achieve this task alone. Government, utilities, and the private sector need to work together if the country is to realize the full benefits of cost-effective energy efficiency measures. While we hesitate to prescribe specific roles for the many parties involved in energy efficiency implementation, it is clear that market barriers can best be overcome if each party exercises its influence where it has the greatest leverage.

Federal and state governments have enormous capabilities for information development and transfer. They can foster research and development into energy efficiency technologies and increase the availability of training through universities and governmental agencies. And significantly, government can enact standards for buildings, appliances and equipment.

As California's example shows, standard-setting can be a very powerful and cost-effective tool for overcoming the market's hesitation to adopt new, efficient technologies. California's appliance and building efficiency standards (adopted in the 1980s) accelerated the pace of the state's adoption and use of energy efficiency technologies and equipment, and in only a decade have saved California consumers million of dollars and millions of barrels of oil. However, the process of standard-setting involves complex political negotiations and rarely recognizes technologies and products which have not been tested in the marketplace.

Utility efficiency programs can reinforce and accelerate government efficiency standards by speeding the development and acceptance of new products. Utilities have specific knowledge of customer energy use patterns and needs and are generally viewed as credible sources for energy-related information. Utilities can and do provide financial assistance to customers to adopt new and more efficient energy technologies.

The private sector must ultimately design, produce and incorporate these new technologies and products. Its greatest opportunities lie in identifying market needs, in research and product development, and product marketing.

SPECIFIC COMMENTS ON TITLE III OF S. 341

We commend the comprehensive view which Senators Johnston and Wallop have brought to the debate on energy strategy. No single area of energy policy -- whether in supply or demand -- can offer the whole solution. S. 341 recognizes that both supply and demand factors must be addressed if the country is to meet our energy challenges economically and effectively. In the area of energy efficiency, it proposes necessary and useful steps to address market impediments, but the bill falls short of what should be done by the federal government to enhance the effectiveness of this energy option.

We also commend Senators Johnston and Wallop -- as well as Admiral Watkins and the Department of Energy -- for their efforts over the last several months to listen to all sides of the energy debate.

California's rapid progress on energy efficiency issues has in large measure been due to the open and cooperative attitudes which all parties -- consumers, environmentalists, utilities and regulators -- have brought to the discussions. This "Collaborative Process" has significantly reduced the contentiousness that often characterizes the energy debate. One result of this new climate was the joint statement which PG&E and the Natural Resources Defense Council submitted to the Department of Energy last summer on the importance of energy efficiency to our overall national energy strategy.

PG&E believes that any successful national energy strategy must be founded on the strengths of competition in our market economy, and must assure protection of the environment. In the energy efficiency area, the strategy must aim at overcoming the barriers that prevent full and fair market competition.

Remove Taxation of Utility Rebates: Although tax policy is not addressed in S. 341, PG&E supports legislation that would eliminate the current taxation of utility rebates for energy efficiency equipment. These rebates should be viewed as reductions in the price of efficient equipment purchases, rather than as utility payments for purchases of saved energy. Taxation increases the cost of conserved energy to utility customers, and thereby lowers the attractiveness of rebated equipment.

The specific solution reportedly contained in the National Energy Strategy does not solve this problem. The National Energy Strategy apparently suggests that, as long as a utility rebate appears as a direct customer bill reduction for utility service, the rebate will not be counted as taxable

income. While this may solve the taxation problem for private individuals, the rebated amounts would remain fully taxable for our business customers.

This problem is easiest to see with an example. If a small grocery store receives a $1,000 rebate for installing efficient lighting and refrigeration systems, the rebate would be taxed under current IRS rules. The proposed National Energy Strategy solution would be to not count the rebate as income if it appears as a utility bill reduction. But since the bill reduction would reduce the store's energy expenses, it would end up as a $1,000 increase in taxable income nonetheless. This approach makes the energy efficiency investment (and the rebate) less attractive to the business investor, and may in fact induce greater energy consumption if the rebate is perceived as a lowered utility rate.

The clearest, simplest and only effective way to avoid these problems is to exempt energy efficiency rebates from taxable income altogether.

Section 3002: PG&E supports Section 3002 concerning Home Energy Rating Guidelines. California and several other states are planning, developing, or have in place statewide energy efficiency rating systems. PG&E recommends that the proposed energy efficiency guidelines developed by the Secretary of Energy support and enhance these state programs and avoid duplication and pre-emption of these efforts. The efforts of the Secretary should also evaluate and compare current and future state programs, in close consultation with the states, to ensure compatibility with the uniform plan for mortgage financing incentives required under Section 946 of the Cranston-Gonzales National Affordable Housing Act (Public Law 101-625).

PG&E is participating in a non-profit public benefit corporation (California Home Energy Rating System (CHERS), Inc.) that includes representatives from the building, lending, real estate and utility industries along with various state regulators. Providing information on whole-house efficiency with a uniform energy efficiency rating will help builders of highly energy-efficient homes with their marketing. It will also allow lenders to justify higher loans or stretched income/debt loan qualification ratios for homes where fuel bills will be reduced. CHERS, Inc., is a model for the kind of voluntary, market-reinforcing cooperation which is supported in S. 341.

Section 3003: We support improved efficiency R&D and joint ventures with energy-intensive industries and suggest that such efficiency demonstrations should receive a larger share of DOE's overall budget for demonstration and joint ventures. We also encourage expansion of this approach to include commercial sector end uses, which actually account for greater electrical energy consumption than does industry. Similarly, more can be done and needs to be done on R&D for residential energy use.

Section 3004: PG&E supports, and is willing to contribute to and participate in, the proposed report to evaluate energy efficiency policies and their potential to decrease overall US energy use.

Section 3005: We support development of guidelines for energy audits in industrial facilities for the purpose of identifying cost-effective energy savings options. We encourage you to consider expansion of these guidelines to commercial, residential and agricultural sectors as well. We also encourage you to consider what vehicles for financial assistance are available and

appropriate to cause the adoption of the recommendations of such audits. We believe that utilities can play an important and supportive role in identifying the need for and delivering such financial assistance.

Sections 3006 and 3008: One policy tool more readily available to federal and state authorities than to a utility is product labelling. If well designed, such labels provide consumers at all levels with credible information on which to base rational, life-cycle purchase decisions.

PG&E supports the sections of S. 341 that provide for the development of labels for new windows and lighting systems. The reliance first on voluntary, industry-developed rating systems is well-placed, though we also agree that federal action must be assured in case of delays. While we believe that voluntary labelling is a good and necessary first step, it must be followed up with market-based support and incentives to achieve the greatest degree of market acceptance that is cost-justified.

Section 3009: We support the continued efforts of the Department of Energy to implement cost-effective standards as required by existing law. We also support those provisions of S. 341 which direct DOE to report on the costs and benefits of new standards for lighting systems and utility transformers.

Subtitle B, Section 3101: PG&E strongly supports Section 3101 of Subtitle B, which would require federal agencies to install efficiency improvements with payback periods of ten years or less. PG&E also supports the provision of this section for federal facilities to take advantage of utility efficiency programs, and we stand ready to help in our service territory. But while we applaud the establishment of a $50 million federal energy-efficiency project fund for these projects, the amount budgeted will be woefully inadequate to capture all the cost-effective opportunities that exist within federal buildings.

Subtitle B, Section 3102: We support the demonstration in federal facilities of commercially viable, state-of-the-art technologies that have received federal assistance.

Subtitle C: This subtitle would amend PURPA to require state consideration of incentive mechanisms for utilities that undertake efficiency programs, and to provide grants to state regulatory authorities to promote least-cost planning. These proposals are already working effectively in California. PG&E supports these provisions of S. 341. We believe that electric utilities can play an essential role in a market-based energy policy. This view requires substantial advances in state regulatory policy; the leadership and funding from the Department of Energy will be important to speeding these changes;

However, we believe that considerable flexibility must be left to the states and utilities to find solutions which fit local circumstances. The California Public Utilities Commission has allowed each of the major private utilities in the state to implement a different set of shareholder incentives and customer programs. There was no need to require uniformity to ensure strong motivation for each utility to succeed.

PG&E's EFFICIENCY PROGRAMS

The following section discusses the regulatory environment in California and some of PG&E's many programs and activities for overcoming market barriers to energy efficiency. These comments are not offered as prescriptive, nor even as necessarily relevant outside of PG&E's service territory. But the progressive role played in California over the past several years by the California Public Utilities Commission and PG&E may be useful as points of departure for the debates and Committee work that will be necessary to meet the stated goals of S. 341.

The fact that our efficiency programs are expanding rapidly and are fully integrated into our corporate planning is in large part due to changes which have occurred in the regulation of utilities in California. Since the late 1970s, the company's net revenues have been decoupled from fluctuations in sales due to weather, customer efficiency gains, or unexpected demand growth. This is accomplished through an accounting mechanism called the Electric Revenue Adjustment Mechanism (ERAM). By adjustments made through ERAM, the utility is largely protected from any revenue losses that might deter its interest in increasing customer efficiency. A similar mechanism protects most of our gas revenues.

The California Public Utilities Commission (CPUC) took a further critical step in 1990. As publicly regulated entities, utilities can be required to carry out energy efficiency programs, and expenses from these programs can be fully recovered through rates. But, as in any private enterprise, the attention, enthusiasm and expertise of the company's management are best directed at those activities that provide clear benefits to shareholders. We cannot expect the creativity and marketing skills of the utilities to be focused consistently through time on areas where there is no return for their owners or, worse yet, where taking those actions would eliminate earnings opportunities that would otherwise exist.

The answer in California has been to develop an incentive for demand-reducing programs which can begin to match the incentives already available for traditional generation. No single incentive system is clearly best for all utilities. Each state and each utility must develop incentives which fit its particular circumstances.

The particular incentive mechanisms instituted for PG&E have two components. First, for programs providing concrete resource value, the expected savings are shared between customers and our utility shareholders. After the efficiency measures are installed, the net dollar savings are estimated and split between customers (who receive 85 percent of the savings through rate reductions) and shareholders (who earn the remaining 15 percent). This mechanism gives PG&E an incentive for vigorous marketing and careful cost control for our energy efficiency programs, and moves them closer to parity with traditional energy supply options.

A second group of programs are undertaken for "social" or "equity" reasons, or have energy benefits that are particularly hard to quantify. For example, PG&E continues to carry out extensive programs to weatherize the homes of our low-income customers, and to provide on-site information and advice to all customers on the benefits of energy efficiency.

To assure that these programs retain their priority, the company is allowed to recover 105 percent of the program cost, with the extra five percent flowing to shareholders. Both of these incentive mechanisms are subject to minimum performance thresholds and careful auditing by state regulators, and inadequate performance would result in financial penalties for the company.

There is a third class of energy efficiency programs, including efficiency technology research, demonstrations and other services, for which the company recovers all costs but no additional incentive payment.

The total potential value of these incentives is substantial, and has brought new management attention to our efficiency programs. We are now able to compare demand and supply options on an equivalent basis, and to pursue the least cost options for the betterment of our customers, shareholders and the communities we serve.

More information about PG&E's efficiency programs is provided in Appendix A.

PG&E has found that an electric and gas utility can play a unique and vital role in reducing costs and protecting the environment. Certain key features of our approach are receiving attention from other utilities, and should be borne in mind in trying to transfer our experience elsewhere:

- A stable and supportive regulatory environment. Utilities must be rewarded for their efficiency efforts, and they must have confidence in the durability of the regulatory climate providing this support.

- Gradual build-up of utility expertise. The promotion of efficient products to our customers requires both a change away from promotion of energy consumption, and the adoption of new techniques for reaching our diverse customers. Even with PG&E's fifteen years of efficiency-program experience, our expansion is challenging our technical and marketing skills. We are planning for a gradual build-up in program size over the next decade.

- Cooperation with local businesses. PG&E works closely with the hundreds of businesses whose products and services we support, so that they see us as a valued partner rather than a competitive threat.

- Programs for all sectors. Support for PG&E's programs would be undermined if one class of customers found that their rates were rising unacceptably to promote the savings of others. PG&E believes that the solution is to offer programs to as many classes of customers as possible, so that everyone has an opportunity to reduce their total bills.

RENEWABLES

PG&E is using renewable energy technologies now. In an average water year, 47 percent of our delivered energy is based on renewable technologies - hydropower, geothermal, biomass, wind and solar. Most of this energy is produced at hydro and geothermal energy sites which we developed years ago because of their unique and economic energy potential. The biomass, wind, and solar generation is of more recent vintage, mostly developed by non-utility generators in the 1980's -- after the passage of the Public Utility Regulatory Policies Act (PURPA).

Though PURPA's implementation in California largely resulted in providing PG&E with high priced gas cogeneration, the act did provide an assured market and contract prices which spurred renewables development in the 1980s. Significant technology advances have been made in the last 10 years. Wind and solar thermal technologies, for example, have progressed through several generations of technology, improving many elements of product design and learning methods of mass production which cut costs. However, for these technologies to continue to develop commercially, they must become more cost competitive.

As we currently see it, renewable technologies can become fully competitive very quickly if two types of action are taken -- first, we need steps to push these technologies more quickly up the learning curve to commercialization ("technology push"), and second, to jump-start the market for applications of these technologies to speed their adoption ("market pull"). Federally supported research, development, and demonstration projects, with an emphasis on joint venture funding, will contribute significantly to this process. Temporary production incentives for renewables should also be considered.

BARRIERS TO COMMERCIAL DEVELOPMENT

The following list of market barriers can be mitigated substantially through a properly focused program of development, demonstration and removal of market inequities.

Limited Utility Experience With Renewable Options - in many areas of the country, utilities have little or no previous experience with renewables. Utilities are generally reluctant to incorporate new, less tested resources in utility generation expansion plans. Naturally, conservative utility executives shy away from the perceived added complexity and reliability risk of operating a utility system to instantaneously meet load at all times while depending on resources that may be available only during certain hours of the day. Utilities also need to learn how to best deploy renewables in their systems. Many of these technologies are highly modular and can be located closer to customers resulting in transmission savings and reliability improvements we do not capture today.

PG&E has had experience with hydro and other renewable resources, and, over time, has gained comfort in incorporating such technologies into our plans and operations.

Inability to Achieve Economics of Mass Production - Because of the current cost differential between fossil and renewable technologies vendors are not able to secure sustained markets and have not been able to achieve the full cost reduction potential of mass production. For example, in the case of solar thermal, the original solar components were hand fabricated and erected using available equipment such as cranes and ladders with many parts assembled in the field manually. The process has come a long way with specially designed equipment for fabrication and erection of equipment and efficient assembly techniques. Many renewable technologies depend upon the economies of mass production rather than the economies of scale. "Learning-curve" cost reductions through early deployment are crucial in this area.

No Clear Policy Demand or Appreciation for the Potential for Renwable Technologies - Federal and State agencies and regulators have not generally endorsed renewables as a significant part of their energy policy objectives. This has created, in some respect, a self-fulfilling prophecy in terms of the role of renewables. While the potential of renewables is not uniform throughout the country, in general, the contribution they could make to solving energy problems is substantially under-estimated. We have found, for example, that solar thermal generation technology existing today, if concentrated in one relatively small remote desert valley in California, could technically supply all of the electrical needs for the state.

Insufficient Funds and Low Priority for R&D and Commercialization - The need for greater attention to renewable and environmentally clean technologies is demonstrated by the proposed 1992 Department of Energy R&D budget -- of the $7.4 billion total, only 3 percent is directed to renewable energy technologies. Some 81 percent of that budget is directed to uranium supply, fission, fusion and nuclear waste. While we fully support all efforts to deal with the nuclear waste problem and feel advanced nuclear concepts will play a role in the nation's energy future, we believe that the Department of Energy needs to shift some funding to address environmentally accepted and more commercially immediate opportunities like many of the renewables.

Tax Biases Which Disadvantage Renewables - Currently federal, state, and local taxes tend to penalize capital intensive renewable technologies compared to their fossil fuel competitors. Renewable technologies are more capital intensive than fossil since they must include not only a power generation component, but a mechanism to "capture" a natural fuel such as water, solar radiation, or wind. These technologies, though requiring more "upfront" capital to develop, use "free" fuel and thus have much lower operating costs than more traditional, fossil sources of energy. However, capital investments are subject to property and sales taxes and tax benefits are delayed through depreciation schedules, while fossil fuel technologies expense the fuel used in their operation. This creates a government induced bias to fossil technologies which must be rectified if "correct" energy supply choices are to be made.

Impediments to Joint Research and Development - With generally insufficient federal funding dedicated to renewable research, it is difficult for utilities interested in joint venture R&D to find a Federal partner with a program budget not already committed to national laboratories. Also, what renewables need today is large scale demonstration to move up the cost reducing learning-curve rather than "basic research." The national laboratories, unfortunately, are entrenched in their "basic research" mentality.

ROLES

PG&E, renewable energy producers, and others in the utility industry are committed to supporting the commercialization of renewables. For example, the cooperative research we are now pursuing with US Windpower is likely to lead to a third generation, variable speed drive machine which will be cost competitive with fossil technologies by 1995.

Additional technology advances are needed, but there are limits to the role regulated utilities such as PG&E can play. Research, development, and demonstration and "learning-curve" experience projects require large investments. The benefits of such research can be a boon to the nation, but a regulated utility generally has no proprietary interest in the technology and must fund these efforts through local ratepayers.

The federal government must support the advancement of renewable technologies. Federal efforts to date have improved the technology base in renewable technologies, but much work remains to be done outside the laboratory to reduce the economic premium one would pay for these emerging technologies.

PROPOSED ADDITIONS TO S.341

While PG&E fully supports the intent and approach embodied in Title IV, S.341 as currently written does not go far enough with domestic research and domestic applications for renewables.

COOPERATIVE RD&D

Although not currently present in S.341, PG&E supports increased joint venture funding being made available to domestic renewable energy projects. We see advantage to directing a higher portion of the federal energy research and development budget to joint venture research in the renewable energy area. For example, several hundreds of millions of dollars of the federal budget are allocated to research in fusion, but it is difficult to imagine how companies like PG&E can help leverage those federal dollars by contributing to co-funded research. By contrast, we can participate in and contribute to research in renewable energy technologies and produce more research effort for every federal dollar spent.

Joint ventures also provide tremendous synergy in the interactions between technology developers and technology users. Utilities can provide necessary insight into market requirements to assist the vendors in product design and market development. Federal seed money can help release this creative potential.

Not only should such cooperative research be in the DOE's base programs, they should be priority activities for DOE. The current prioritization within DOE is very nearly the opposite. The National Energy Security Act should encourage a realignment of DOE's budget priorities.

As a poignant example, a promising utility/DOE joint venture that PG&E has been pleased to be involved with is the highly successful photovoltaics systems test initiative, Photovoltaics for Utility-Scale Application (PVUSA). This program may be a model of what DOE, in collaboration with utilities, can achieve. One must note, however, that though it enjoys verbal support from DOE management and has been going on for several years, the needed funds for the project have never been included in the initial DOE budget sent to Congress. Congress has always been forced to add budget or redirect funding to cover PVUSA program costs.

PG&E is concerned that this may reflect a fundamental misunderstanding of the importance of this type of cooperative research.

PRODUCTION-RELATED INCENTIVES AND TAXATION

While research development and demonstration projects can go a long way to speed up the commercialization of renewable technologies, tax incentives can be a powerful temporary ally in the effort. Congress should encourage the development of a market for renewable energy technologies through legislation establishing production incentives that would remove current biases towards fossil-fuel using technologies and provide a temporary stimulus to critically important market entry and development. It is not enough to have viable technologies languishing in national laboratories waiting for a user. There must be a vehicle for industry to take such technology, and within the discipline of the market system, transform it to market-ready products.

Although we are not opposed to investment tax credits, production-related incentives are likely to be more effective and efficient than investment tax credits in advancing immature industries to the point of a sustainable market presence.

Production incentives should be structured along lines similar to those proposed by DOE in the National Energy Strategy process. The incentive should provide a per kilowatt-hour tax credit for energy production to utilities or independent energy producers over a specified period of time. The amount of the credit will need to be carefully determined, and must be adjusted to the relative competitive position of the particular emerging technology.

COMMENTS ON SPECIFIC SECTIONS OF S.341

Subtitle A - CORECT

PG&E supports the CORECT and its activities, which contribute to the development of markets for emerging renewable energy technologies, and would agree with increased funding and emphasis in this promising area, within the authority of the interagency working group. This action can help address the "market pull" barrier but may not contribute significantly to large scale use of renewables in well developed utility grids like we have in this nation. This program should complement, not displace, domestic efforts for rapidly advancing renewables.

Subtitle B - Renewable Energy Initiatives

Section 4101 - Joint Ventures for Renewable Energy Development for Oil Replacement and Technology Export Training - As noted above, PG&E is strongly supportive of the joint ventures concept, and would support activities in all of the named renewable energy technologies, but - again - not if it must be at the expense of other core domestic renewable research activities.

Section 4102 - Report on Waste Minimization Technologies in Industry - PG&E recognizes the importance of this topic, which is addressed by both our research and operating departments for key industries in our service

territory, and would support a well defined study, if the study were funded outside existing renewable programs.

Subtitle C - Hydropower

PG&E firmly believes that this section of the bill would streamline the regulation of hydropower in an efficient manner, and, as the operator of the nation's largest hydropower system, we applaud this section of the bill. Since this is an important area for us, we have submitted separate written testimony to support this afternoon's hearings.

CONCLUSIONS

To summarize, PG&E believes that there are promising opportunities to expand the ongoing relationship of PG&E and other utilities with DOE and other federal organizations, to work together to accelerate the commercial readiness of new technologies, and to achieve widespread, fully cost-competitive, beneficial utility applications of renewable energy sources in the next 10 to 15 years. We also believe energy efficiency can be the cornerstone of actions we can take now to bridge the gap to large scale deployment of new generating technologies. Achievement of these objectives will expand the country's portfolio of electric supply technology choices, decrease our vulnerability to oil price and availability uncertainties, and produce a secure and sustainable energy future that is environmentally sound.

However, PG&E is disappointed that the President's National Energy Strategy and S.341 do not go as far as they should in supporting customer energy efficiency and renewable approaches to energy security. They should be a core thrust of our energy strategy, not a sideline act. We believe that much more can be done and needs to be done if this country is to achieve a truly well-balanced, secure and least-cost energy future.

PG&E encourages this committee to continue its dialogue and collaborative approach to energy policy development. We are willing to contribute to the defining and refining of issues and market-based solutions. We strongly support the need for private/public sector cooperation and coordination and stand willing to support the on-going work of this committee.

APPENDIX A

PG&E EFFICIENCY PROGRAMS

Customer Information: Several PG&E programs provide information to customers about the availability of efficient technologies and their life-cycle benefits. We provide on-site inspections and other information for residential, commercial and industrial customers. In some cases, these visits are combined with actual installation of low-cost energy-saving measures.

In addition, much of the company's overall advertising, both through company mailings and through the media, emphasizes the value of efficiency and provides specific information or advice. Our market research indicates that customers consider the information we provide to be credible and valuable to them.

Training: PG&E maintains two award-winning training centers for energy technicians of all types. Although most participants in these programs are PG&E employees, we have also trained hundreds of outside energy auditors and other technicians in the last ten years. PG&E is establishing a Food Technology Center to demonstrate energy-efficient and environmentally sound technologies for California's food and agricultural industries. The Center will identify, coordinate and cost-share the research, development and technology transfer activities needed to respond to foreign competition and environmental problems facing this important customer sector. PG&E has just broken ground to construct the Pacific Energy Center. This 30,000 square-foot facility in San Francisco will provide a central location for state-of-the-art products, exhibits, demonstrations, and application laboratories in which to test the performance and aesthetics of energy-efficient equipment and systems. Seminars, classes and workshops will offer architects, builders, developers and others a wealth of information on the latest technology and its potential to make dramatic reductions in energy use.

Risk Management: Several of our programs are designed to reduce risks for buyers and manufacturers by providing targeted financial support or practical demonstrations of new technologies. We are supporting annual construction in each of our 25 divisions of a new home which incorporates advanced efficiency systems (including air-conditioners, insulating systems, lighting, etc.) in residences that are clearly marketable and liveable.

We have also initiated a $10 million project to research and demonstrate integrated systems of advanced technologies (the Advanced Customer Technology Test for Maximum Energy Efficiency, or ACT2) whose results will be valuable both to our future program designs and to customers. This project is further evidence of the fruits of the broad cooperation that has been established in California. The ACT2 project is overseen by an executive committee that includes representatives from NRDC, Rocky Mountain Institute and the Lawrence Berkeley Laboratory.

PG&E is also undertaking a test of Demand-side Bidding. This project, undertaken in response to an agreement in the California Collaborative and endorsed in subsequent state legislation, will test methods of expanding market penetration of efficiency improvements beyond that which a utility alone may be able to accomplish. Again, PG&E is providing statewide leadership in this test, with the advice of a committee of regulators,

consumers, environmentalist, energy service companies, and other major utilities.

PG&E is leading a collaborative effort with refrigerator manufacturers and other utilities to reduce the financing risks of developing and marketing advanced refrigerator technology. Federal standards have now set an ambitious program of efficiency improvement for the next seven years. The product changes necessary to meet both these standards and the phasing-out of ozone-depleting refrigerants are stretching the capital and skills of the industry, making them little interested in exceeding the minimum requirements.

PG&E and others, however, believe that significant advances beyond these standards are still possible and economically feasible. We have therefore added a special category to our ongoing refrigerator rebate programs to provide rebates of as much as $300 per refrigerator for products which exceed

the 1993 federal standards by at least 25 perent. Our goal is to reduce the risk manufacturers face in moving this much faster than federal standards already require.

Costs: Most of PG&E's resource-producing efficiency programs provide rebates to customers to cover part -- or even all -- of any increased costs for efficient equipment. Rebates are provided directly to customers or sometimes to salespeople. They cover efficient equipment in both new and existing buildings, and they are offered to residential, commercial, industrial and agricultural customers. Of our total spending of $147 million on energy efficiency planned for 1991, nearly $50 million will be for these direct rebates. In addition, PG&E has weatherized the homes of over 500,000 low-income customers who could not otherwise have afforded any cost-reducing investments, and continues to provide these services.

These rebates serve several functions: they help overcome the barriers of increased first cost or short payback requirements; they reduce any perception of risk from customers by lowering costs and giving evidence of PG&E's confidence in efficient equipment; and they are perhaps the best single marketing tool at our disposal.

Separation of Buyer from User: Several of these rebate programs are specifically aimed at the equipment buyer who will not also be the user. In addition to the rebates for efficiency in new homes and offices, PG&E's refrigerator rebates are available to home builders or rental owners to encourage them to buy appliances which go beyond minimum federal and state requirements.

The CHAIRMAN. Thank you very much, Mr. Reuger.

Next, we will hear from Mr. James Wolf, Executive Director of the Alliance to Save Energy.

STATEMENT OF JAMES L. WOLF, EXECUTIVE DIRECTOR, ALLIANCE TO SAVE ENERGY

Mr. WOLF. Thank you, Mr. Chairman.

The alliance is pleased to testify on S. 341. We are a national nonprofit coalition of Government, business, environmental, and consumer leaders dedicated to energy efficiency, and we conduct research, pilot projects, and advocacy programs to achieve that goal.

We are very pleased from the statements of the chairman and other members of the committee about the importance of energy efficiency in an integrated national energy strategy. We believe, however, that the specific provisions in S. 341 could be significantly strengthened. I will concentrate today on titles III and IV, although I do share the comments of Mr. Reuger and others on title VI, in particular, the importance of energy research and demonstration.

Overall, we believe the policy approach and criteria should be specifically articulated in the bill, and we believe there should be a least-cost or integrated approach to addressing our energy needs. We believe this least-cost or integrated approach should include the weighing of environmental externalities that are not reflected in the marketplace, such as environmental costs. And we also believe it appropriate to include other factors such as diversity, reliability, and security of sources of supply. We believe that we should be smart shoppers and do the best buys first.

Conducting such a least-cost integrated analysis we believe will yield a balance between energy efficiency and production, very different that merely saying we should achieve a balance between the two. We believe doing this integrated approach, the predominant resource that the Federal Government will try to acquire will be energy efficiency and renewable energy resources.

I site a recent poll conducted jointly by the Alliance and the Union of Concerned Scientists which demonstrated that three out of four Americans prefer reducing demand rather than increasing supply as the best way of achieving our future energy needs, and I attach a cop of that poll to my testimony.

Concerning utility programs and issues, we comment on four areas, the first on regulatory reform, or making the least-cost plan the most profitable. We strongly commend the chairman for including this provision and its goal as well as the grants to States in section 3202 to achieve it.

We suggest slightly different word-changing in the provision in the statute which would more closely parallel what the Environmental Protection Agency is doing in the Clean Air Act amendments which established a special allowance for conservation and renewable energy resources and programs conducted by utilities.

This specific language is included in my testimony. In addition to requiring States to consider reforming regulations to make the least-cost plan the most profitable, we recommend that that be extended and that also a State should be required to consider envi-

ronmental externalities in the least-cost planning process. We do not recommend that States be forced to adopt specific values for the environmental externalities, but we believe that they should be required to consider doing so at the same time they undertake the proceeding to consider changing regulation.

We strongly endorse the move toward competitive markets, including demand side as part of that truly competitive market. However, there are significant regulatory barriers to implement these, and we believe where there are barriers to the implementation of competitive markets, other Federal policies are appropriate. We recommend that if a State has either (a) not adopted competitive bidding procedures coupled with demand side bidding, or does not require least-cost planning coupled with regulatory reform, then conservation should be qualified as part of PURPA. So doing, conservation will be able to have access to the marketplace in those States which do not adopt a more competitive market model that truly allows conservation to compete on a level playing field.

Next, concerning the Federal Power Marketing Administration's Tennessee Valley Authority, we are pleased that the chairman asked the questions about the Federal PMA's. We believe it very important that the Federal PMA's be required to conduct three elements: (1) that all contract from Federal PMA's require the purchasing utility to conduct a least-cost plan and pursue all cost-effective conservation in its service territory; (2) we recommend that the PMA's themselves be directed to begin an aggressive program to assist utilities, both conduct least-cost planning and acquire cost-effective conservation; and (3) the Federal power marketing agencies themselves, we believe, should also begin their own programs to acquire cost-effective conservation in their region.

Finally, we believe the Tennessee Valley Authority should be required to operate similar to Bonneville Power Administration in the Northwest. I know Mr. Watson reflected the close working relationship of Washington State and BPA, and it is no accident that among the best conservation programs in the country, we here on the east coast are often pointing to the Northwest. And in large part, that is due to the Bonneville Power Administration leadership. We believe it is time TVA operate similar to Bonneville and be required to conduct the least-cost plan.

I will next address some suggestion for what we believe the Federal Energy Regulatory Commission could promote the acquisition of cost-effective conservation. Although I recognize that more detail is dealt with in title XV, we do not believe that FERC should directly itself engage in least-cost planning, but we believe that its practices should encourage least-cost planning to the maximum extent at the State level.

We believe this could be accomplished (1) through an expedited review process for proposed purchases that are demonstrated to be consistent with State-approved least-cost plans; (2) we believe that FERC should be required to consider environmental externalities in its approval of sales, particularly because the State regulatory commission of the purchasing utility may not evaluate the environmental damage associated with generation in another State.

And finally, we strongly recommend that an office of energy efficiency in the environment be specifically established at FERC.

Right now, we find we are dealing at the periphery of other offices who feel their main charge is, frankly, "other concerns." We believe this will significantly elevate the importance of the issue at the Federal Energy Regulatory Commission.

On the issue of taxation of utility rebates, we strongly recommend that be included in this provision to make utility rebates nontaxable to the residential, commercial, and industrial recipient. We note the administration's National Energy Strategy would exempt utility bill discounts, but we believe this is not appropriate for two reasons: (1) a bill discount, in fact, is only apt to encourage more consumption. More importantly, bill discounts are very complex for a utility to administer, and if this was the avenue pursued, these conservation incentives would only apt to be offered to the largest of industrial customers.

On supply-side efficiency, we believe there is vast opportunities to improve energy efficiency on the supply side. We recommend that the bill include a provision on district heating and cooling, specifically having the Department of Energy expand its current program to provide technical assistance to States and localities to evaluate it, as well as it be required in the least-cost planning process.

On the Federal Energy Management Program, Mr. Chairman, we commend the initiatives that the committee is undertaking in this bill, but believe they could be strengthened significantly. The Alliance will be releasing a report this week that we believe unfortunately characterizes Federal energy management. The title of the report is called Energy Use in Federal Facilities, Squandering Taxpayer Dollars, and Needlessly Polluting the Environment.

The Federal Government is spending $3.5 billion annually to heat, cool, and power its buildings. We believe the taxpayers could save over $850 million a year by application of cost-effective technology. The specific changes to the bill we recommend are: (a) on leased buildings, a requirement that all leased buildings have to meet the model Federal Energy Conservation Standard after 1993. The current draft of the bill only provides that would be applicable to buildings constructed after 1994.

On automotive purchases, the bill merely directs GSA to consider the fuel efficiency of the automobiles it purchases. That basically is no different than current requirements. We recommend that the administrator of GSA be directed to refuse to accept for bid any automobile that is less than fuel efficient than the average it its size class.

We believe a program should be begun for incentive bonus for facility energy managers. As in private industry, we need to motivate the facility manager who does an outstanding job saving energy. We believe the best way to do this is through a DOE-administered program of direct cash bonuses for outstanding energy managers. And we are confident this will be more than offset by the energy savings achieved.

We believe we need budgetary reform and enforcement. Budgetary procedures should be changed so that agencies have an incentive and may retain a dollar portion of their savings from energy project. This was done to a limited extent in last year's Defense Authorization Bill.

We also recommend very strongly that the inspector general of every agency and department be required to report to the Department of Energy on that agency's compliance, the other agency's compliance, with the Federal mandate to implement cost-effective technology.

We believe increased authorizations are appropriate for this section, because the $50 million fund provided does not start to tap the conservation potential. I concur strongly with Secretary Davis' testimony on this point that, overall, we believe authorization should be specifically given for each section in the bill. We do not want to just mandate the department to do something without giving them the adequate resources to accomplishment. And the DOE conservation staff under Mr. Davis' leadership, we believe, has the potential to significantly affect the direction of energy efficient investment in the Country.

On energy efficient lighting in the Federal Government, we recommend the GSA product schedule be changed so that compact fluorescent bulbs are aggressively implemented and installed in the Federal Government. We recommend the development of a Federal purchase power, what we call a "golden carrot" incentive. That a new program should be begun where the Federal Government would specifically design *and formally purchased pledge* a large number of new products that are more efficient that those currently existing, in essence, creating a golden carrot for the product manufacturer.

This could include, for example, refrigerators for public housing units, automobiles, or other products the Federal Government now purchases. I note that several utility consortia—I believe PG&E is, in fact, participating in one, are proposing to do this, and I think leveraging the Federal Government purchasing power with utility consortia would be very, very effective in developing golden carrots to get better products into the market.

On industry sections in the bill, we have one technical comment to section 3003, where we believe the objective of the joint venture should be changed from "the" principal objective of saving energy to "a" principal objective. Often, energy savings will be a by-product of other important objectives of the venture such as improved product quality.

We believe the Department of Energy should undertake a new initiative to promote the adoption of current technology. Traditionally, DOE has emphasized research in technology adoption, and has taken a very passive role in promoting the adoption of a technology. I note this contrasts with the Department of—Environmental Protection Agency's Green Lights Program where they are aggressively assisting corporations relamp their facilities.

We believe the DOE should undertake a new initiative working with the marketing executives in corporations to get energy-efficient lights and other products into the marketplace quicker. We recommend the committee consider reinstituting the goals in the reporting program for industry that was in effect in the late 1970's, early 1980's. This had a very, very significant affect in the case studies we did with industry in actually implementing cost-effective technology. Industrial energy managers told us that this was very important to help them get products funded.

In the residential and commercial building sector, we note that the administration's proposal appears to be more aggressive than that embodied in this bill, and we urge the committee to adopt some of their proposals, specifically, that all homes within 5 years would have a rating at time of sale; that new homes within 1 year would have to meet, if they would achieve a Federal guaranteed or insured mortgage, at least the model energy code. The Cranston-Gonzales Act last year provided this threshold for all FHA mortgages. We believe that should be extended to VA and other mortgages as well.

We also recommend the bill as noted should require States to review and upgrade their building codes, both residential and commercial. For existing homes, at the end of the 5-year period, after the rating system is mandatory, we believe that any home eligible for a Federal mortgage would have to meet at least the then current version of the model energy code.

On oil-heated homes, Mr. Chairman, we note there is still 12 million homes in this Country that heat with oil or use oil for their hot water. Often, these homes are ineligible for utility-sponsored conservation programs to improve their heating efficiency. We therefore recommend that the committee consider a targeted tax credit for these homes limited to 2 years duration. And the tax credit would be for items such as replacement of old oil burners with newer flame-retention burners, or for traditional weatherization measures such as insulation, better window technology.

On appliance and equipment standards and labeling, I concur with both Mr. Watson and Mr. Reuger. We believe now is the time for action, not just study. We note that Congressman Sharp's proposal requires the Secretary to develop standards, and that they be cost-effective. We strongly concur with this for both lamps and luminaries, motors and distribution transformers, small package commercial air conditioners.

We do recommend, however, that there is one area where study is appropriate, and possible labeling is appropriate. In the commercial sector in particular, the plug-in loads are among the loads of the utility companies increasing the quickest. This is such items as computers, copiers, and other office equipment. We recommend that the Secretary be directed to conduct a study of these items for possible standards or labeling procedures later.

On the renewable energy title, Mr. Chairman, we have two specific recommendations for additions. One is that the CORECT be directed to conduct specific market assessments for targeted counties. We had a meeting with the efficiency manufacturers, and they told us that this was one of their highest priority needs to assist them to export products.

Finally, we recommend that every other year, the Secretary be directed to prepare a report on the R&D commercialization and export assistance programs that our major foreign industrialized competitors provide to their energy efficiency and renewable energy industries. We believe this report will assist the Congress, will assist the administration, as well as our domestic manufacturers prioritize their programs.

I note, Mr. Chairman, that the transportation section in title XI is not specifically part of today's hearing, and I merely recommend

that the committee enact strong provisions in that section of the legislation.

Thank you very much. We look forward to working with the chairman and his staff.

[The prepared statement of Mr. Wolf follows:]

PREPARED STATEMENT JAMES L. WOLF, EXECUTIVE DIRECTOR, THE ALLIANCE TO SAVE ENERGY

I appreciate the invitation of the Committee to testify on Titles III and IV of S. 341, the National Energy Security Act of 1991. The Alliance to Save Energy is a national nonprofit coalition of government, business, environmental and consumer leaders dedicated to increasing energy efficiency. We conduct research, pilot projects, educational programs and policy advocacy to achieve this goal.

The importance of achieving an energy policy is now recognized to be more important than ever. I wish to commend the Chairman and other members of the Committee who have made statements emphasizing that conservation and efficiency must be an integral component of that strategy. We look forward to working with the Committee to strengthen the bill in this vital area.

The specific provisions in S. 341 that address conservation only begin to tap the cost-effective potential for making our country more competitive, secure, and environmentally cleaner. An analysis conducted jointly by the Alliance and American Council for An Energy Efficient Economy estimates that the savings from the provisions in the current draft (including some titles that are not the subject of today's hearing) are only .28 quads in the year 2000 and 1.05 quads cumulative during 1993-2000.

I will detail specific initiatives or modifications to the bill that the Alliance recommends. I will also comment on some conservation provisions in the Administration's proposed energy strategy, although the specifics will not be known until the legislative language is forwarded in the near future. There are apt to be some programmatic initiatives the Administration is undertaking where it will claim that legislation is not needed. I remind the Committee that the establishment of goals, timetables and reporting requirements in legislation is good policy. Too many initiatives that the Department could undertake without new legislation have been languishing.

POLICY APPROACH AND CRITERIA

It is important that the bill clearly set forth the national policy and criteria being used in constructing our national energy strategy. We believe that the approach should be a least-cost approach to meeting our energy needs. The least-cost approach should include the weighing of externalities that are not reflected in the marketplace, such as environmental costs. We also believe it appropriate to evaluate other factors, such as diversity, reliability, security and related issues about the sources (including efficiency) of energy. Let us be smart shoppers and do best buys first.

Such an evaluation will yield a "balance" between production and efficiency very different than merely saying we will have a "balance" between the two. The balance doing a least-cost analysis will emphasize efficiency and renewable energy resources, a path clearly preferred by the American people. In a recent nationwide poll conducted by the Alliance and Union of Concerned Scientists, three out of four Americans preferred reducing demand rather than increasing supply as the best means to meet our energy needs. I have attached a copy of that poll to my testimony.

UTILITY PROGRAMS AND ISSUES

A. Regulatory Reform

1. Least-Cost Profitability

We commend the provision in Section 3201 requiring states to consider reforming regulations so that the least-cost plan is the most profitable, and Section 3202 which provides grants to states regulatory authorities.

We suggest, however, that slight word changes may be appropriate to have the language parallel the recently enacted amendments to the Clean Air Act which provide a special allowance for utilities which promote conservation. We suggest the criteria should be that "the rates and charges be such that the net income of the

electric utility after implementation of cost-effective conservation measures is at least as high as such net income would have been if the energy conservation measures had not been implemented."

As in the regulations being developed for the Clean Air Act, this language would require that the utility be compensated in full for lost sales attributable to the utility's conservation program. We would leave it to the state's discretion whether the utility should also be compensated for the net income lost on a foregone investment in electricity supply.

2. Environmental Externalities

We recommend that a provision be inserted to require states to consider environmental externalities in the proceeding they conduct on considering changing regulations to make the least-cost plan the most profitable. The consideration would not require states to quantify environmental externalities, but they would have to conduct a hearing to consider the issue.

Several state have already adopted procedures formally incorporating environmental externalities. It may change the resource mix that is selected in the planing process. New York State is among those in the forefront of this process.

3. Encouragement of demand-side competitive markets

We endorse the movement toward competitive markets. Where there are regulatory barriers to the implementation of these, we believe that other federal policies are appropriate. We recommend that if a state either (a) has not adopted competitive bidding procedures for new supplies that includes demand side bidding, or (b) does not require least-cost planning coupled with reforms to make the least-cost plan the most profitable, then conservation should be qualified as part of PURPA in those states. These alternatives will significantly foster the market in conservation. It should encourage states to pursue competitive and least-cost approaches to tap the conservation potential.

B. Federal Power Marketing Administrations and Tennessee Valley Authority

The Federal Power marketing Administrations sell low-cost power to private and public utilities. Without addressing whether the rates for this power should be changed, it is clear that utilities which have access to it should have an obligation to show that they are making wise use of this federal resource.

There should be a requirement that all new contracts for supply of federal power to a utility be predicated on the utilities conducting a least-cost plan, and aggressively promoting all cost-effective conservation and efficiency in its service territory.

We also recommend that the federal PMAs begin an aggressive program to assist the utilities it supplies both to conduct least-cost planning and acquire all cost-effective conservation. This assistance will be particularly valuable to smaller utilities.

The federal power marketing themselves should also be directed to begin programs to acquire directly cost-effective conservation resources in the region. The costs of these programs would be recouped through the charges to the utilities it supplies.

The Tennessee Valley Authority should be required to operate similar to the Bonneville Power Administration in the Northwest. Congress in the Northwest Power Planning Act created a regional planning council that prepares least-cost plans. It has had a remarkable record of success and it is no accident that among the best conservation programs in the nation are those in the northwest.

We suggest a regional body be established for the area TVA serves and that it be directed to prepare least-cost plans for TVA. There is no excuse for federal utilities not to do this when we are encouraging private utilities to do so.

C. Federal Energy Regulatory Commission

The Federal Energy Regulatory Commission should not directly engage in least-cost planing. We believe that this is better accomplished at the state level. We believe, however, that FERC should encourage to the maximum extent possible least-cost planning. This could be accomplished in part by an expedited review process for proposed transactions where the purchasing utility demonstrates that its long term contract purchases are consistent with a state approved least-cost plan.

Purchases not having such a demonstration are apt to cause unneeded power to be generated, and consequently extra pollution emitted. Closer federal scrutiny, or even penalties such as extra fees, may be appropriate.

Particularly because of the concern about pollution, we recommend that FERC be required to consider environmental externalities in approving sales. The regulatory body in the purchasing state may not consider them because the pollution is being

generated in another state. FERC, pursuant to a mandate in the Clean Air Act, is directed to conduct a study of environmental externalities.

We also recommend that an office of energy efficiency and the environment be established at FERC. Too often now these issues are only dealt with peripherally, if at all, by the other offices at FERC.

D. Taxation of Utility Rebates

Currently, the IRS is imposing a tax on conservation investments. When a utility gives a customer a rebate to become more efficient, the IRS considers it as taxable income to the recipient. This decreases the value of the rebate as well as imposes a burdensome administrative reporting requirement to the IRS on the utility. This tax should be ended and utility rebates treated as tax-exempt, as was previously the case in the residential sector.

The Administration National Energy Strategy would apparently exempt utility bill discounts to become more efficient, but not rebates for the installation of more efficient equipment. This is not a good proposal for two reasons. First, the bill discount is only apt to encourage more consumption. More importantly, only large customers are apt to be eligible for the discount. The complexity of billing makes it unlikely it would be offered to a great extent except to the largest of customers.

E. Supply-Side Efficiency

The potential for improvements on the supply side is vast. We encourage the bill to include a provision on district heating and cooling. This provision should provide technical assistance to states and localities to evaluate it, as well as a requirement that it be considered in the least-cost planning process.

There are also vast differences in the efficiencies of existing power plants. We suggest a study to document the reasons for the efficiency differences (e.g. do fuel use clauses restrict incentives for improving efficiency). The study should contain specific recommendations for both technology and regulatory changes to improve efficiencies in plants.

FEDERAL ENERGY MANAGEMENT PROGRAM

We commend the Chairman for recognizing that the federal energy management program needs massive overall. The Alliance to Save Energy is releasing a report this week on this subject—"Energy Use In Federal Facilities—Squandering Taxpayer Dollars and Needlessly Polluting The Environment." The federal government is not only the largest energy user in the country, it is also the largest waster of energy.

The federal government spends almost 3.5 billion dollars to heat, cool and power its buildings. Implementation of cost-effective technology could save the taxpayer over $850 million a year.

We recommend the following changes and additions to Section 3101:

A. Leased buildings

All space leased after 1993, whether a new lease or a renewal, shall meet the model Federal energy conservation standards for commercial buildings. These standards apply to all Federally constructed buildings. The draft legislation only makes this applicable to buildings constructed after 1994 that are proposed to be leased.

B. Auto purchases

The draft legislation only requires that the Administrator of GSA "consider" the fuel efficiency of vehicles. This is virtually no different than current requirements. We recommend that the Administrator be directed to refuse to accept for bid any vehicle that is less efficient than the average efficiency for that size class the proceeding year, and that a bid premium be given for greater efficiency autos.

C. Incentive bonus for facility managers

As in private industry, we believe that incentives should be given to facility managers that do an outstanding job saving energy. We recommend that the Secretary administer a special cash bonus award for facility managers providing for a cash bonus of not less than $2,500 and not more than $10,000 to facility managers in any federal agency. The amount of dollar savings to the government would be the primary evaluation criteria.

D. Budgetary reform and enforcement

Budgetary procedures should be changed so that each agency may retain a dollar portion of the savings from any energy saving project. Absent such an incentive, as has been provided on a selected basis in the Defense authorization bill, an agency

will have little incentive to implement projects. Each federal agency should also be required to have a line item for investment in energy conservation in its budget request to the Congress.

We also recommend that the Inspector General of each agency report to the Department of Energy on that agency's compliance with the federal mandate.

E. Increased authorization

The authorization level of 50 million dollars is woefully inadequate considering the opportunities at hand. We recommend a minimum three year authorization starting at $75 million the first year, $125 million the second, and $200 million the third. While we recognize that this fund is designed to supplement funds requested directly by the other agencies, we believe that the Department of Energy must take the leadership on this issue.

F. Efficient lighting

The provisions concerning the federal product schedule are good ones for all products. In addition, however, we recommend that the schedule be changed specifically on lighting so that only compact fluorescent bulbs are purchased for current 60 and 100 watt applications. A special waiver would have to be obtained for the purchase of traditional incandescent bulbs—e.g. a showing of limitations in the size of fixtures.

G. The Federal Purchase Power and developing "Golden Carrots"

The power of the federal government as a consumer to encourage the development of efficient products has never been utilized. We recommend that a new program be established to formally pledge to purchase a large number of new products that are more efficient than those currently existing—creating a "golden carrot" for product manufacturers. This could include, for example, refrigerators for public housing units that are at least 40 percent more efficient than the best available today; autos, etc. Some utility consortia in California and elsewhere are considering a similar approach, and coordinating a federal program would greatly increase its power.

We recommend that the program begin with a study to be completed within one year containing specific recommendations for programmatic initiatives. The study would identify target products, including specifications for the golden carrot, purchasing commitments, and possible coordination opportunities with the utility industry or others.

H. Demonstration of new technology

Section 3102 calls for the preparation of a plan to demonstrate new technology in federal facilities. We believe that now is the time for action; not just planning. At least $10 million should be appropriated to implement the plan. Those demonstrations should include fuel cell technology, as was proposed in S. 324 which passed the Senate last year.

INDUSTRY

A. Joint ventures

Section 3003 is a good provision that will have long term energy saving benefits. We suggest, however, that the criteria be changed so that the demonstration of energy savings does not have to be "the principal objective" of the joint venture. We recommend that the language be that the demonstration of energy savings must be "a principal objective."

This change is advisable because energy savings are often a by-product of another important concern, such as improved product quality. Significant energy savings may result from such a joint venture, even if the energy savings were not "the" principal objective. This suggested change would allow more flexibility in administering the program and the targeting of those projects with the highest energy savings.

B. Auditing Procedures

Section 3005 is to be commended for recognizing the potential improvements to industrial facilities are vast. A new report from the Thermal Insulation Manufacturers Association shows that there are 29,000 miles of uninsulated pipe in American industry! We believe this section, as well as others, should be amended to encourage participation and consultation with nonprofit organizations and associations as well as industry groups.

C. Technology Adoption

The Department of Energy has traditionally taken a very passive role in promoting the adoption of technology. This stands in marked contrast to current programs at the Environmental Protection Agency.

For example, EPA is doing far more in its "Green Lights" program to promote the adoption of energy efficient lighting that DOE has ever considered. It is part of an overall pollution prevention program at EPA, and is an example of an outstanding government program. It asks corporations to pledge to relamp with cost-effective efficient lighting. EPA provides some technical assistance and other services.

We recommend that a formal program be begun in DOE to get proven energy efficient technology into the marketplace quicker. The thrust would be different than DOE's current emphasis in its technology transfer program. The latter program emphasizes moving products from the laboratory to early adoption in the marketplace; it is valuable and should continue as a complement to this new initiative.

This new program would emphasize working with the marketing executives in corporations, not researchers. We believe that this would significantly accelerate the pace of market penetration. We believe the program should be authorized at five million dollars annually.

D. Goals and Reporting

In the late 1970s and early 1980s, the government both established voluntary energy efficiency targets for industries and required reporting of energy use through the trade associations. This program was halted in the early 1980s.

Industry has made vast improvements in energy efficiency. But the attitude in the United States towards industrial energy use stands in marked contrast to that of Japan. In Japan, industrial facilities over a certain size are required to have certified trained energy managers. We do not favor adoption of the Japanese model here, but a program similar to that which used to exist for reporting and voluntary goals can have great merit.

In case studies the Alliance did in the early 1980s of 15 firms in energy intensive industries, the energy managers uniformly told us that the goals and reporting requirements were very helpful to them in getting needed projects implemented. Indeed, one manager felt they were responsible for more projects going forward than the then existing tax credit.

The goals and reporting heightens management attention and allows them to compare themselves against industry averages. We are cognizant that this program should not be structured to be burdensome to industry, but believe that substantial improvements can be realized with minimum intrusion.

RESIDENTIAL BUILDINGS

The provisions in Section 3002 are a good attempt to establish a home energy rating system coupled with better mortgage incentives. We believe, however, that they can go further. Although the specifics of the Administration's proposal in this area are not yet clear, they are apparently more ambitious than those in this bill.

A. Ratings

We recommend that the bill's guidelines for voluntary rating systems be encouraged for 5 years of development. At the end of 5 years, all homes, both new and older ones, would have to receive a rating prior to sale. The rating would be coupled with information about energy efficient mortgage programs. The administration proposal does not specify the date when this requirement would have to be met.

B. Minimum efficiency for Federal mortgages

1. New homes

Within one year, we believe that all new homes should have to meet at least the federal Energy Code of the Council of American Building Officials to be eligible for any federal subsidy insurance or guarantee on the mortgage. The Cranston-Gonzales Affordable Housing Act provides this threshold for all FHA mortgages. We would extend it to other government programs as well, such as VA mortgages.

We also recommend that the bill should require states to review and upgrade their building energy codes, with technical assistance from DOE. A recent Alliance study of the Model Energy Code shows that the majority of states could benefit from such an exercise, saving a total of .2 quad annually when fully implemented.

2. Existing homes

At the end of five year period when all homes, both new and existing, would need a rating prior to sale, we believe that a threshold rating equivalent to at least the

then current version of the Model Energy Code should be established to be eligible for any federal subsidy, insurance or guarantee on the mortgage. The energy efficient mortgage programs would be available for purchasers who wished to improve the efficiency of an older home to be eligible for the federal subsidized or guaranteed mortgage.

DOE's own analysis of the effect of requiring ratings shows that after 10 years in the marketplace, energy efficient mortgage/home energy rating programs can save about 1 quad annually, more than 10 percent of all residential energy demand.

DOE should begin work on model retrofit programs in conjunction with the rating work, and provide technical assistance to the states to implement it.

C. Oil heated homes

There are 12 million homes that still heat with oil in the United States. Often, the oil also supplies the hot water in these homes. These attributes often means that these homeowners do not qualify for targeted utility conservation programs or subsidies to become more efficient in their heating or hot water use. This attribute, coupled with the particular importance of reducing oil use, warrant special attention.

Accordingly, we recommend that a tax credit be given for these homeowners. We would limit it for two years duration. The tax credit would be for replacement of older oil burners with flame retention burners (7 million of the 12 million homes still have the older inefficient burners), and for traditional weatherization measures such as insulation, better windows, or water heating wraps.

APPLIANCE AND EQUIPMENT LABELING AND STANDARDS

A. Lamps and luminaries

Sections 3008 provides a program to label lamps and luminaries. Lamps are already basically labelled, although the program to label luminaries is a good one. We believe, however, that the bill should go further. The Secretary of Energy should be directed to conduct a rulemaking to establish minimum efficiency standards for the major categories of lamps. This rulemaking should be completed within 18 months.

The Secretary should also be directed to conduct a rulemaking to consider standards for luminaries, in particular to ensure that they are compatible for compact fluorescent and other high efficiency lighting.

B. Motors and distribution transformers

Section 3009 requires the Secretary to conduct a study and issue a report on the advisability of standards for these products. We recommend that the Secretary instead be required to conduct a rulemaking for these products and be directed to establish efficiency standards for them within 18 months. In the case of motors, the National Electrical Manufacturers Association has a definition of high efficiency for some classifications of motors, and this could be established as the base standard in the legislation itself.

C. Small package commercial air conditioners

We recommend that small package commercial air conditioners be added to the list of products for which the Secretary would define the product class and establish standards for them.

D. Other commercial products

There is one category where we do think it appropriate that the secretary conduct a study of possible labeling and standards, but not at the current time be directed to issue a standard. The office environment in particular is undergoing increased electrification, and "plug-in loads" such as computers, copiers and other equipment is accounting for an increasing percentage of utility load.

The efficiency of these products, from televisions to VCRs to computers, varies greatly. A labeling program, for example, would assist utilities who may want to conduct incentive programs for more efficient equipment. Standards may be found to be warranted in the future.

TITLE IV: RENEWABLE ENERGY

We are pleased that the Chairman recognizes that energy efficiency should be incorporated as part of the current CORECT program. We suggest that Section 4001 be changed so that the training and technical assistance could be provided through any nonprofit institution, not just one "designed solely and specifically to support . . ." exports. The current language might exclude nonprofit organizations such as the International Institute For Energy Conservation (IIEC), The Alliance To Save

Energy, and many other nonprofits who are actively undertaking these tasks and working with the efficiency industry.

A. Market assessments

We recommend that a specific task be added for CORECT to provide specific market assessments on targeted countries. This market assessment would include program and policy developments in the foreign country which would impact on the market for efficiency. In a meeting the Alliance and IIEC had with the efficiency industry, they told us this was one of their high priority needs.

B. Report on R&D, Commercialization and Export Assistance

The Secretary should be required to report to the Congress every other year on the foreign government programs in energy efficiency and renewable energy of our major industrialized foreign competitors. The report should detail their R&D funding levels and priorities, and evaluate what types of government assistance is available to manufacturers to assist them commercialize, market, or export their products.

This is a function that need not be assigned to the CORECT program, but we believe it very important that the Department undertake it. It will assist the Congress, the Administration as well as manufacturers better shape program priorities.

TRANSPORTATION

I recognize that the Committee will be holding separate hearings dealing with CAFE and other transportation issues addressed in Title XI of the bill. I merely note that we urge these sections be strong because of the importance of transportation to the overall National Energy Strategy. The committee should consider innovative market mechanisms, such as coupling a gas sipper tax credit with an expanded gas guzzler tax; and ending the inequity of unlimited employer subsidies for free parking but limiting the amount that can be provided for the use of mass transit.

CONCLUSION

I appreciate the invitation of the Committee to testify and would be pleased to work with the staff to develop specific language for the initiatives detailed in this testimony. We hope that the Committee will incorporate these provisions so the efficiency provisions in this bill can truly be labeled as outstanding.

The CHAIRMAN. Thank you very much.

Finally, we have Mr. Scott Sklar, Executive Director of Solar Energy Industries Association.

Senator WALLOP. Mr. Sklar, would you just forgive me, Senator Dole has a meeting of ranking members which I must attend, and I wonder, Mr. Chairman, if I could ask the indulgence of the witnesses if I could address a few questions in writing to them. I have some concerns about the heavy emphasis on least-cost versus the integrated resource planning.

I worry that it just directs us so specifically to certain technologies to the exclusion of other ones. I want to see how we can get out of that bind, because it seems to me, at this moment in time, both are necessary. And I always worry a little bit when we get into lighting and luminaries and other kinds of things that we get so specific in what we write in the legislation that some new technologies are not available because they are either not covered or because they represent something different.

Just the other day I saw something in the Wall Street Journal about a new house lighting source which is a central source that pipes light much as heat is piped. And, I worry that when writing a piece of legislation that one thing will consume so much energy that it doesn't qualify and you do not realize what it does for all the rest of the rooms. This gets me back to the least-cost versus integrated cost.

Your testimony has been interesting, and I am sorry not to be able to develop some of these questions in person. But if you would indulge me, I will try to make them short and to the point.

The CHAIRMAN. Thank you, Senator Wallop.

Mr. Sklar.

STATEMENT OF SCOTT SKLAR, EXECUTIVE DIRECTOR, SOLAR ENERGY INDUSTRIES ASSOCIATION

Mr. SKLAR. I will keep it short, Mr. Chairman. We have sat through a lot of energy strategy hearings before, and I wanted to make four major points to you.

One, that renewable energy technologies have matured beyond the research phase; that over the last decade we have 8,000 megawatts of nonhydro-renewables working today. All of those technologies are under 8 cents a kilowatt hour except photovoltaics, which will be so this decade. And we have 1,000 megawatts displaced from solar water heating in 1.2 million buildings. And that is expanding to industrial process heat. So there has been some significant market penetration.

S. 341 does some things that goes beyond the National Energy Strategy, and that is to make some capital available to increase what Mr. Williams and Mr. Reuger implied was the need to increase awareness of the technology in the real world. That is what we need to do.

Your bill, in developing joint ventures, helps us get some capital to take commercial technology, increase the awareness, and attract some more capital for larger projects. We need to go a little beyond that, (a) in some incentives in your legislation to get the labs to be more responsive in transfer of technology that is sitting there, and (b) to develop other kinds of capital pools so once these joint ventures are in place that are cost-shared by industry, the utilities, State governments, and the Federal Government, that we have a capital pool that can do long-term financing.

If we can bring the plant cost down per month below the fuel cost, utilities will use or access this technology more. You do not need a Ph.D. in economics to understand that, and that is indeed our goal. And the more we can show the domestic market expanse, the more we will be able to track private capital to scale up manufacturing and therefore lower the cost.

I have inserted in my testimony a title-by-title review on some of the bill. It is a good bill to start with, and I want to thank you for it. And I think if we can tweak some of the language, deal with some technology transfer, orient some of the joint ventures to be a little more useful to the industry, and develop some capital pools to follow-up the joint ventures, you will have a very strong piece of legislation that will double the contribution of renewable energy from 9 percent of the total U.S. energy mix to near 20 percent by the end of this decade.

Thank you for your interest in this area.

[The prepared statement of Mr. Sklar follows:]

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TESTIMONY

by

SCOTT SKLAR
EXECUTIVE DIRECTOR
SOLAR ENERGY INDUSTRIES ASSOCIATION

before

SENATE COMMITTEE ON ENERGY & NATURAL RESOURCES
SOLAR & RENEWABLE ENERGY SECTIONS OF S.341

FEBRUARY 26, 1991
WASHINGTON, D.C.

INTRODUCTION

With over 500,000 U.S. troops fighting in the Middle East, and the recent release of the National Energy Strategy by the Administration, the U.S. solar and renewable energy industries deserve more serious attention by the U.S. Congress in 1991.

The National Energy Strategy is not a balanced document. In fact, solar and renewable energy receive only two real benefits which include increased federal research and development at some unspecified level, and extension of the existing solar and geothermal business energy tax credits for one year at the 10 percent level. While these benefits are real, they fall very short of what should be supported by the U.S. government as a way to achieve maximum practical benefits from solar and renewable energy.

The recently introduced "National Energy Security Act of 1991" (S.341) goes a step further than the National Energy Strategy in regard to solar and renewable energy development. I plan to only comment on the energy conservation and renewable energy sections in the bill. The two most important concepts carried out in the bill, is the need to aggregate investment capital via cost-shared solar & renewable energy joint ventures to quicken market acceptance; and that these renewable energy applications can directly offset imported oil in a significant way.

But policymakers must accept the fact that solar and renewable energy technologies have matured enough to produce 8,000 megawatts of electric power from geothermal, photovoltaics, solar thermal, wind, and wood energy, and to displace over 1,000 megawatts from solar water heaters in over 1.2 million buildings nationwide. Almost all of these applications can produce or save energy under 8 cents per kilowatt hour and only need more defined markets so that the solar and renewable energy companies can attract capital to scale-up manufacturing to lower costs even further.

A series of additional incentives are required to further define the markets which include investment and production tax incentives, government procurement and federal power marketing administration utilization goals, specialized technology transfer from the national laboratories, and federal financing via existing federal loan programs as well as some new ones. Failure to seize the initiative on solar & renewable energy commercialization will not only insure petroleum imports will creep beyond the present 51 percent level, but may undermine the current U.S. technological lead to such an extent that our country may be importing the very technologies we created!

Net Utility Connected Electric Power Generation from Renewable Energy Sources (Million kWh/year)	Technology	1992	1993	1994	1995	1996	1997	1998
	Wood & Wood Waste[a]	321	379	886	1.383	1.177	1.477	1.674
	Geothermal[b]	4.843	6.075	7.741	9.325	10.308	10.775	10.300
	Hydropower	309.000	332.000	321.000	281.000	291.000	250.000	223.000
	Solar Thermal[c]	n/a	n/a	n/a	23	56	181	312
	Wind[d]	6	49	196	671	1.218	1.727	1.868
	Cumulative	314.170	652.673	982.496	1.274.898	1.578.657	1.842.817	2.079.921

THE NEED FOR BOLD FEDERAL INITIATIVES

Within less than a decade solar and renewable energy electric and thermal output has on-the-average quintupled and costs have fallen below 8 cents per kilowatt hour for all renewables except for photovoltaics which will do so in this decade. With an intelligent and aggressive federal commercialization effort, solar and renewable energy market penetration could double during the decade of the 1990's bringing the total renewable energy contribution currently at 9 percent to nearly 20 percent of total U.S. energy.

To accomplish this market penetration would require significantly less than the $3.5 billion given to the existing fossil industry in FY'91 in the tax bill. In fact, for less than $500 million per year over the next 9 years, this investment would accomplish a greater than 20 percent market penetration of solar and renewables through market and loan incentives, federal R&D and technology transfer, and procurement and regulatory goal-setting.

The existing solar and geothermal business energy tax credits have been an effective and significant market incentive which has allowed some of the larger, more mature companies to attract capital to finance projects from large (80 MW+) electric generation to commercial solar industrial process heat and water heating projects. These incentives must be extended for five years with the existing strict recapture rules which allow the credits to be used only on working applications. The tax credits have been proven as a key ingredient in attracting capital needed to successfully bring relatively new applications to fruition.

Additional incentives for all renewables would be useful as a way to further balance the market. While conventional energy receives greater subsidies than renewables, and the conventional fuels may be deducted as a standard business expense, a production tax credit has surfaced as one way to level these market biases. Current thinking involves a 2-3 cent production credit to last over 10 years of the project's life.

The federal government is the largest single user of energy and the largest owner of buildings in the United States. The federally-supported Power Marketing Administrations (PMAs) distribute more than 80 percent of the electricity used in this country. Yet the basic federal guidance over the years which includes "Integrated Resource Planning" or "Least Cost Energy Planning" have not really been a significant inducement to utilize demand-side or supply-side renewable energy applications. Two basic policy initiatives must be implemented as a way incentivize larger-scale, newer applications of solar and renewable energy technologies. Federally-prescribed goal-setting allowing government agencies and the power marketing administrations flexibility to use rebates, shared-savings, subsidized-financing, or mandatory purchasing should be encouraged. The Department of Defense serves as an excellent example of how the old guidelines do not work since even shared-savings applications, which DOD claims as the preferred option, have yet to get through the procurement system. Finally, funding must be made available through the U.S. Department of Energy's (DOE) Technology Transfer budget to pay for travel by PMA and federal agency procurement personnel to receive training at DOE-sponsored seminars so that they can make intelligent decisions on the technological and economic aspects of solar & renewable energy systems.

Federal research and development must be enhanced to build reliability and familiarity of solar and renewable energy applications. To the Administration's credit, they have pursued a series of R&D initiatives to speed the commercialization process. The Photovoltiac Manufacturing Initiative will allow the existing industry to overcome technical hurdles to scale-up manufacturing. Additional initiatives for solar and renewable energy are underway and current appropriations in FY'91 already exceed authorizations levels specified under P.L. 101-218. Therefore, the Senate Energy and Natural Resources Committee must increase these authorizations for FY'92 for biofuels ($55 million), photovoltaics ($82.5 million), solar buidings ($10.4 million), solar thermal ($58.5 million) and wind ($26.5 million).

These higher appropriations numbers include funding for cost -shared joint ventures, as specified under P.L. 101-218, which would support validation projects to inject new advances in solar and renewable projects more quickly into the marketplace. Many of these projects are covered under the Renewable Energy Initiatives in section 4101. These joint ventures must be expanded to include the solar thermal STEPS initiative to rapidly commercialize solar thermal central receiver, dish/engine and enhanced trough applications, as well as the wind industru's medium turbine initiative.

Joint ventures, which are cost-shared with the solar industry, utilities and other endusers, state and local governments, and foundations serve as a key ingredient in building domestic markets. The only way to really make market inroads is to build the visibility of technology applications and build the experience level of potential endusers. Significant cost-shares ensure commitment by industry and other parties towards the successfull completion of a project. Cost-shared joint ventures serve as an innovative way to aggregate capital to develop new projects. Continued support of joint ventures as outlined in S.341 are needed with the additional requirements as outlined in the next section of my testimony.

With increasing research and development budgets, new techniques are required to pull technology development out of the national laboratories. The laboratories have been partners with industry in commercialization. Specifically, the Sandia Design Assistance Center represents a successful program in this regard. However, with increasing programs, laboratories become more concerned with program build-ups rather than enhanced technology transfer in a short-term timeframe. About $20 million is needed to institute some new innovations in technology transfer from the laboratories to the solar industry, other applied research and technology prganizations and to state governments.

Nearly half of all solar and renewable energy technologies and services are exported, mostly to Third World countries. The federal interagency board, the Committee on Renewable Energy Commerce and Trade (CORECT), has been a useful tool in promoting the U.S. industry through specialized marketing materials, overseas project identification missions, trade and catalogue missions and trade shows, and resource, market, and financing analysis and assistance. CORECt needs a minimum of $2.5 million for FY'92 to support the development of overseas generic industry offices to serve as marketing arms of the U.S. industry in Eastern Europe, the Pacific Rim, and the Caribbean Basin & Latin America. Tighter oversight on CORECT to insure that it retains its industry-driven approach that has successfully worked in the past should be instituted. In addition, directives to CORECT to support interagency initiatives for renewable energy financing such as The Fund for Renewable Energy & Efficiency (FREE) should also be included.

However, the United States will be unable to expand its overseas markets in the face of intense international competition, if our domestic markets are not expanding. Long-term financing is the only way to significantly enhance the market penetration of high-capital technologies such as solar and renewable energy. A two part national strategy must be developed to this end.

The first approach to a federal goverment solar and renewable energy financing program would be to require that these technologies have access to existing federal financing programs which include energy such as the Rural Electrification Administration, Farmers Home Administration, FHA/VA housing loan programs, as well as DOE State & Local funding programs including Schools & Hospitals and weatherization, and HUD's retrofit and low-income housing programs.

The second approach would be to establish specific capital pools via the U.S. Department of Energy which could subsidize interest rates on ten-year loans for residential and small business applications for solar water heating, solar industrial process heating, energy efficient lighting systems, and energy saving windows. Other loan subsidy funds should be made available over a 25-35 year period for larger -scale solar & renewable energy applications in the utility and industrial sectors. Such funds could come from income derived from fees attached to a range of ongoing energy programs which could be utilized to underwrite these financing programs.

There is absolutely no question that significant market penetration will NOT occur unless some long-term financing is available, as it is currently available to the existing energy industries through federal programs. The government does not necessarily have to supply or guarantee the loans as much as to buy-down the loans through interest subsidy or partial principle underwriting. Any real National Energy Strategy must include a long-term financing option in both the residential/small business and utility/industrial sectors.

SPECIFIC RECOMMENDATIONS TO S.341

As stated earlier, I will only comment on the energy efficiency and renewable energy sections of the Bill. Under the Energy Efficiency Title (Title III), Subtitle A, language is not sufficient to encourage the use of solar water heating and solar industrial process heat as one of the energy efficieicny options.

Under Subtitle B dealing with Federal Energy Management, travel funds should be made available to federal procurement officials to attend DOE-sponsored energy efficiency and renewable energy technology seminars. A special office within DOE should be established to provide design assistance and joint ventures with federal agencies for renewable energy projects and to instigate shared-savings projects.

Page six

Under Subtitle C regarding Utilities, should be expanded to require that the Federal Energy Regulatory Commission (FERC) in consultation with the U.S. Department of Energy to issue guidance to state regulatory commissions on how to consider the attributes renewable energy applications in emissions reductions, demand reduction, load shifting, and peak power production.

Under Title IV, Renewable Energy, CORECT's authorization for FY'92 is adequate. CORECT's additional duties should not be broadened to "promote more efficient use of fossil fuels". As stated earlier in this testimony, CORECt should be instructed to establish U.S. industry overseas outreach offices as well as to contribute to a special pre-investment financing facility for renewable energy and energy efficiency.

Under Title IV, Subtitle B, the Renewable Energy Initiatives should be modified and expanded. First, a Solar Thermal Electric Joint Venture should be added to include the STEPS Initiative which should provive $5 million in FY'92 to scale -up existing central receiver, validate new dish/engine technologies, and enhance a new generation of solar troughs. The Photovoltaics and Wind Joint Ventures (4) should be separated into specific joint ventures at $3 million each.

Under the same Title and Subtitle, Renewable Energy & Energy Efficiency Technology Export Training should not be considered as a joint venture. Projects can be joint ventured, training should be supported through proven, existing solar and renewable energy training institutions such as the Florida Solar Energy Center.

Overall, the Renewable Energy Sections of S.341 is a good start and deserves, with minor modifications, to receive support.

CONCLUSION

As charts below indicate, solar and renewable energy applications already significantly contribute to the United States' energy supply. The challange is for the United States to increase these technologies to even more significantly offset oil imports and reduce our country's energy dependency on unstable regions of the world. The potential for solar and renewable energy is profound and the benefits which include pollution mitigation and employment creation are quite large. Our country now has an opportunity to take advantage of our competitive edge or relinquish the opportunities to our competitors. The times call for bold action and I implore the U.S. Congress to do so in 1991.

COST OF NEW ELECTRICAL GENERATION
IN CONSTANT 1987 DOLLARS

	Low	High
Solar Thermal Hybrid	6.0	7.8
Nuclear	5.3	9.3
Natural Gas (Intermediate)	5.3	7.5
Hydro	5.2	18.9
Wind	4.7	7.2
Coal Boiler	4.5	7.0
Natural Gas Combined Cycle	4.4	5.0
Geothermal Flash Steam	4.3	6.8
Biomass Combustion	4.2	7.9

Cents/kWh

Source: California Energy Commission 1990 ETSR

Table for Figure 4. Renewable Energy as a Fraction of State Energy Consumption, By State

State	Percent	State	Percent	State	Percent
Washington	53.54	Nevada	9.78	Rhode Island	4.10
Oregon	47.46	Virginia	9.06	Iowa	3.25
Idaho	46.49	Minnesota	9.05	Utah	3.18
South Dakota	29.42	Connecticut	9.04	Oklahoma	3.16
Montana	28.97	Arizona	8.87	Nebraska	3.10
Maine	27.00	Hawaii	8.03	Alaska	3.07
Vermont	22.64	Kentucky	6.49	West Virgini	2.97
New Hampshir	20.21	Florida	5.80	New Mexico	2.96
Alabama	17.25	Colorado	5.33	Pennsylvania	2.69
Arkansas	16.25	Louisiana	5.31	Wyoming	2.52
Mississippi	16.02	North Dakota	5.24	Ohio	2.37
Georgia	15.91	Massachusett	5.20	Illinois	2.20
California	13.44	Missouri	4.81	Indiana	2.05
North Caroli	12.57	Wisconsin	4.64	New Jersey	1.04
Tennessee	12.55	Maryland	4.56	District/Col	0.44
South Caroli	11.67	Michigan	4.27	Texas	0.44
New York	10.62	Delaware	4.17	Kansas	0.28

Table for Figure 3. Barrels of Oil Equivalent and Carbon Dioxide Avoided by Renewable Energy Resources

Source	Trillion Btus	Barrels of Oil (Millions)	Carbon Dioxide (Million Tons)
Biomass	3,457.4	587.8	276.6
Geothermal Electric	236.6	40.2	18.9
Geothermal Direct	18.7	3.2	1.5
Hydro	3,119.8	530.4	249.6
Solar Thermal Electric	7.8	1.3	0.6
Photovoltaics	0.3	<0.1	<0.1
Wind	22.4	3.8	1.8
Solar Buildings	52.0	8.8	4.2
TOTAL	6,915.0	1,175.5	553.2

The CHAIRMAN. Thank you very much, Mr. Sklar.

I might mention, I think all of you know that we did not put any tax provisions in this bill. To do so would take it out of our jurisdiction, so we just could not do that. Whether or not we will try to do it on the floor is another thing. It depends upon really whether it is a House bill, you know, tax bills must originate in the House, or whether it will be done at another stage perhaps in the House when they are dealing with the legislation.

Mr. Wolf, you talked about least-cost planning, cost is an accountant's word, and yet you talk about environmental externalities which is not an accountant's word. How would you measure these externalities?

Mr. WOLF. We believe that it is best left in the context of least-cost planning to the State level when the State commissions are doing so. New York State, for example, already has a formal procedure adopted pursuant to a year and a half long procedure in New York State Commissioner Williams can speak about, where they have assigned a specific value in the resource bidding process to each of the various pollutants that they have identified, SO_2, NO_x, even carbon dioxide.

Those values are included in when the resource is evaluated for a least-cost plan. And my understanding, for example, is that recently a proposed coal plant in New York was displaced by a natural gas plant, because when the environmental externalities were added that the truly least-cost one, from a societal perspective, was the natural gas as opposed to the coal.

Now, those costs do not, in the New York program, get passed on to the ratepayer. They are only used for the resource selection mix.

The CHAIRMAN. It seems to me, though, that that changes an objective criteria into a purely subjective criteria.

Mr. WOLF. Well, right now, we do, as we say in a sense, value environmental externalities; it is just that we place a zero value on them. And right now, what New York State and Commission Bradford has said is they are trying to place an objective value on them. He has conceded that it is not a perfect assessment, but he believes that it is better than what we are doing now.

The CHAIRMAN. But is it not subjective? I mean, for example, you have a hydrodam, and it is going to interfere with the fish. How do you value the fish?

Mr. WOLF. Well, in the northwest—as you know, the Northwest Power Planning Act had a specific requirement for valuing conservation at a premium because of the concerns over the salmon runs in the northwest.

The CHAIRMAN. I am not saying it should not be considered a value, but it seems to me that the two concepts of least-cost planning and environmental externalities are an attempt to quantify something that is just basically unquantifiable.

Mr. WOLF. I believe that New York State, for example, is using, in part, proxy measures such as control technology. What would the cost of control technology applicable to a power plant be? And there are other specific proxy measures including an assessment of the damage caused by the pollution that are appropriate.

Now, different States are approaching it differently, but we believe that it is important that as a principle, that that be estab-

lished as an appropriate for State regulation. And Commissioner Williams can talk to that.

Ms. SKLAR. Mr. Chairman, just to give you another example, and it may not be environmental externalities, but fuel diversity as a consideration. The State of Hawaii, which is very dependent on imported oil, every time there is some lunatic dictator that wants to play around with oil supply, the price to the consumer becomes immense, and electricity prices have gotten outrageous in Hawaii.

If there was some criteria, some measurement that the State could consider to give some attributes to those technologies that provide some greater fuel diversity, and in this case mostly domestic renewables, you will have the consumer protected from these mad fluctuations due to things beyond their control. So it is not just some benign social cost things as maybe what snail darters were; some of it is really how small businesses and businesses can deal with immense swings in cost of energy.

The CHAIRMAN. Well, do you understand I am very strongly for first considering environmental matters, secondly for diversity of fuels, and thirdly, or maybe firstly for alternatives and conservation. But it just seems to me, to speak of that in the same breath with cost planning—I mean, for example, in Hawaii you have a very highly controversial project dealing on the big island with your geothermal. How do you value that? You know, to some, they look at that and they say, this is destroying this rain forest which is of priceless value, and others who say, well, it is only going to be a little smudge on this huge—three trees in a big forest. What kind of value would you put on that?

Mr. WILLIAMS. Mr. Chairman, I would be pleased to send you the proceeding we have developed in New York, because it is a very precise—it was a very lengthy proceeding that endeavored to take into consideration all of the relevant factors and come up with a specific number. In our case, the number is 1.4 cents per kilowatt hour, and that is the specific value that we established that must be included as an environmental cost. Recognize also——

The CHAIRMAN. For any kind of energy?

Mr. WILLIAMS. In the competitive bidding process. And what this does is to ensure the people who are submitting bids to satisfy either supply or demand side needs. And that factor be taken into consideration so that a dirty applicant does not have an unfair advantage over a clean applicant. And that is what that——

The CHAIRMAN. Can you tell me how that works?

Mr. WILLIAMS. What we have done is to, as a result of the process that Jim suggested to conclude it, and ordered, as a matter of condition, a commission order. A legally issued opinion indicated that the value of that environmental cost—and Jim indicated——

The CHAIRMAN. Which environmental cost?

Mr. WILLIAMS. Of the costs that are included in all the bids that the utilities offer to purchase either supply or demand side capacity. And so when the applicants—for example, PG&E is an applicant in building a project in New York State. And in the evaluation of the bid that they submit, the utility must attach or must take into account that environmental externality computation of 1.4 cents per kilowatt hour.

The CHAIRMAN. No matter which technology is used?

Mr. WILLIAMS. That is right. In order to assure that all of them are then evaluated equitably, and related to, as Jim indicated, the coal plant which serves as sort of a framework or basic model. But in the overall concept of least-cost, recognize too that it is very, very difficult, and one of the things that have troubled us most sorely is the process of evaluation and verification.

How much of the returns that we say are there in terms of more efficient lighting and all the rest are actually being realized? Well, this depends upon very careful calculations, meters in the commercial buildings, and all the rest.

The CHAIRMAN. I still do not understand this least-cost planning.

Mr. WOLF. Mr. Chairman, let me just add, I think you may be confused by Hank's use of phraseology. The 1.4 cents, it does vary depending on the source of the energy. In other words, there is a different environmental externality, even solar has an environmental externality which is different than coal, different than natural gas.

Mr. SKLAR. It is very teeny, though.

Mr. WILLIAMS. The 1.4 cents is the basic module that has been developed.

The CHAIRMAN. That is the average?

Mr. WILLIAMS. Yes.

The CHAIRMAN. And what are the different amounts?

Mr. WILLIAMS. Well, what comprises the 1.4 cents?

The CHAIRMAN. Well, you have got 1.4 cents per kilowatt hour on the average. Dirty-burning coal is how much?

Mr. WILLIAMS. I think Jim has confused you. Maybe the best thing to do would be to supply you with the proceeding that describes this process.

[The material submitted by Mr. Williams follows:]

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CONSIDERATION OF ENVIRONMENTAL EXTERNALITIES IN NEW YORK STATE UTILITIES' BIDDING PROGRAMS FOR ACQUIRING FUTURE ELECTRIC CAPACITY

In the attached reports, staff of the New York State Department of Public Service discussed rationale for the consideration of social costs or the economic values of environmental externalities associated with power generation projects in the utilities' bidding programs. Staff proposed a method for scoring environmental factors which was adopted by the Commission in two of its utilities' bidding programs.

For further information on the staff reports, you may contact Sury Putta (518-474-5368).

CONSIDERATION OF ENVIRONMENTAL EXTERNALITIES IN COMPETITIVE BIDDING PROGRAM TO ACQUIRE FUTURE ELECTRIC CAPACITY NEEDS OF NIAGARA MOHAWK POWER CORPORATION

by

New York State Department of Public Service

Public Service Commission staff supports using an approximation of social costs or the economic value of environmental externalities in the scoring of the environmental values of the bids. Staff asserts that price and the social cost of electric generation are interrelated, and that reducing social cost of environmental impacts would increase the price of electricity generated, and vice-versa. Reflecting an estimate of social costs in bidding will allow environmentally superior bids to compete with other bids, despite their typically higher price. Recognizing environmental externalities in this fashion should encourage bids that make better use of scarce public resources.

Staff has reviewed the available information on the economic values of environmental externalities to determine the proper weight to be allotted to the environmental factor in the utilities' bidding programs. That weight should be equal to a fraction of the weight assigned to the price factor, calculated by dividing the estimated economic value of the environmental externalities by the average winning bid. For example, if the maximum score for price is 60 points, and the economic value of the

environmental externalities and the average cost of the winning bids are 1.5 cents and 6.0 cents, respectively, the maximum score for the environmental factor would be 60 x 1.5/6 = 15. Considering the environmental values in this manner will remove some of the inefficiencies in scoring bids and encourage bidders to design their packages to maximize their score by efficient allocation of both private and public resources.

Staff evaluated the weight for the environmental factor based on the approach adopted by the Commission in the Orange and Rockland's and LILCO bidding programs. While the economic values of environmental externalities are not readily available, the Commission staff and the State Energy Office (SEO) have estimated those values for air emissions, which appear to cause most of the social cost attributable to power generation projects. Assuming that all projects will comply with the Federal New Source Performance Standards (NSPS) (which is a threshold requirement for all bids), the SEO has estimated the cost of avoiding the residual emissions from each kilowatt hour of coal-fired generation to be about 0.25 cents for SO_2 emissions and 0.55 cents for NO_x emissions. For carbon dioxide (CO_2) emissions, SEO estimated the cost of mitigation at 1.85 cents/kwh and a consultant for Pacific

Power[1] estimated a cost of 0.37 cents/kwh. A report prepared for the Commission of European Communities[2] estimated the cost of damage from CO_2 emissions at 0.005 cents/kwh of electric generation. Considering the wide disparity between these estimates as well as existence of some controversy surrounding the need for controlling CO_2 emissions, it appears reasonable for the Commission to recognize the global warming problem and to employ an estimate of 0.1 cent/kwh cost as social cost of CO_2 emissions. It is staff's view that before New York State decides to charge itself the full amount for its CO_2 emissions, it should be assured that other states and countries are also acting to resolve this problem. Staff recommends in the present circumstance that New York's utilities take small unilateral steps to reduce CO_2, and be prepared to take more substantial steps as national and international agreements are formulated. Use of high estimates, such as the one provided by SEO for the CO_2 cost in scoring bids, would offer an advantage to gas-fired generation over coal-fired cogeneration that would be so significant it might result in a de facto ban on coal-fired generation. The other major emissions associated with power generation are smoke and fine particulates, which are tightly regulated by the NSPS. Staff estimates the cost of controlling the

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1 IRT Issues Review and Tracking, Vol 4, Feb. 9, 89.

2 Social Costs of Energy Consumption by Olav Hohmeyer, 1988.

residual particulate emissions from coal-fired generation to be 0.005 cents/kwh.

Two other major environmental externalities of electric generation projects are discharges into water bodies and effects on land use, both of which are local in nature. Water discharges are tightly regulated by the federal and state laws and regulations, and the residual impacts of water discharges from power projects, after federal and state requirements are met, are small. Staff estimates the cost of controlling the residual water discharges would be on the order of 0.1 cent/kwh. Land use related impacts are controlled under the State Environmental Quality Review Act (SEQRA) and all projects proposed by bidders will be subject to environmental review by the State Department of Environmental Conservation. Although it is difficult to estimate the economic value of the residual land use impacts of projects that pass muster under SEQRA, staff believes that the differences in the residual impacts among projects acceptable under SEQRA will be small and their economic value or social cost, in terms of dollars per unit of electric power generation, will be small compared to the cost of air emissions externalities. A case study on the environmental costs and benefits of a nuclear power plant of Bonneville Power Administration estimated that the land use related social cost ranged between 0.1 and 0.44 cents/kwh. Until better cost estimates are developed, staff recommends that the Commission direct the utilities to adopt 0.4 cents/kwh as the social cost of land use impacts and assign

about one-half of the point score applicable to for the air emissions to land use impact in the first round of bidding.

The foregoing staff analysis, with the assumptions stated, suggests the economic values of environmental externalities are as follows:

Externality	Economic value in cent/kwh
Sulfur oxides	0.25
Nitrogen oxides	0.55
Carbon Dioxide	0.1
Particulates	0.005
Total air emissions	0.905
Water discharges	0.10
Land use impacts	0.4
Total cost of externalities	1.405 cents/kwh

After adjusting for regional construction cost differences, the corresponding cost for Niagara Mohawk would be 1.364 cents/kwh.

The avoided cost of electric generation for the company is 6.34 cents/kwh,[1] and it is reasonable to assume the average winning bids will be about 90% of the avoided cost, or 5.7 cents/kwh. Thus, the environmental externalities cost amounts to

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1 Opinion No. 88-13 sets forth 6.34 cents/kwh for the 15 year (1989-2002) levelized avoided costs for Niagara Mohawk at the generation level.

about 24% of the average winning bid (1.364 cents/kwh divided by 5.7 cents/kwh). Since Niagara Mohawk's bidding system is stated in terms of points rather than costs, the 24% figure needs to be translated into an equivalent number of points.

Niagara Mohawk allocates 850 points for the price score and 50 points for price schedule score. The scoring method proposed by the company permits the bidder to earn 8.5 points on price score and about 0.5 to 1.0 points on the price schedule score for each percentage the bid prices falls below the full avoided cost for the company. For the environmental externalities to receive a weight equal to 24% of avoided cost, the environmental externalities score should be given 216 to 220 points in Niagara Mohawk's scoring formula. Niagara Mohawk proposed to only assign a total of 110 points to the environmental factor. Staff recommends a total of 220 points be allocated to environmental factors (210 points for environmental attributes plus 10 points for environmental benefits).

The weights assigned to the Environmental Attributes by Niagara Mohawk in the Environmental Rating Form need to be revised to reflect the relative weight given to each environmental area. Staff believes that implementation of the foregoing recommendations and other revisions to the scoring methods satisfy concerns expressed by the SEO. Accordingly, staff revised the Environmental Scoring Form proposed by the utility as presented in the Environmental Scoring Form (attached).

ENVIRONMENTAL SCORING FORM (ESF)

Case 88-E-242 -- Niagara Mohawk

Environmental Attributes	Weight (W)	Points (P) 0	1	2	3	4	5	Score W×P
AIR EMISSIONS								
Sulfur oxides (Lbs/MWH)	7	>6	4.0-6.0	2.5-3.9	1.5-2.4	.5-1.4	<.5	
Nitrogen oxides (lbs/MWH)	16	>6	4.0-6.0	2.5-3.9	1.5-2.4	.1-1.4	<.1	
Carbon Dioxide (lbs/MWH)	3	>1500	1050-1500	650-1049	250-649	100-249	<100	
Particulates (lbs/MWH)	1	>.3	.2-.3	.1-.199	.05-.099	.01-.049	.01	
WATER EFFECTS								
Cooling water flow/MA 7CD 10 yr. flow or annual intake as % of lake vol.	1	80-100	60-79	40-99	20-39	5-19	<5	
Fish protection	1	None		Operational restrictions		Fish protection provided	No public water used	
NYS Water Quality classification of receiving water	1	A or better	B	C(t)	C	D	No water use or municipal water/ wastewater treatment utilized	

Environmental Attributes	Weight (W)	Points (P) 0	1	2	3	4	5	Score W x P
LAND EFFECTS								
Acreage required (acres/MW)	1	.3-.5	.2-.29	.1-.19	.05-.09	.01-.05	<.01	
Terrestrial	1	Unique ecological historical value		Rural or low density suburban		Industrial area	No land is used.	
Visual Aesthetics	1	Highly visible		Within existing developed area		Not visible visible from public roadways		
Transmission	2	New OH >5 miles	New OH 1-5 miles	New UG >5 miles	New UG 1-5 miles	Use existing facilities	Energy conservation	
Noise (Leq Background L_{90})	2	5-10			0-4.9		<0	
Solid waste disposal (lbs/MWH)	2	>300	200-300	100-199	50-99	10-49	<10	
Solid waste as fuel (% of total Btu's)	1	0	1-30	31-50	51-80	81-90	91-100	
Fuel delivery	1	New RR spur	Truck & existing RR	New pipeline	Barge	Use existing pipeline	No fuel use	
Kilometers from sensitive receptor area per 6 NYCRR 225.1.1(b)(4)	1	<10	10-39	40-69	70-100	>100	Energy conservation	
								Total Score Max (210)

METHODS FOR VALUING AND INCORPORATING ENVIRONMENTAL COSTS IN ELECTRIC RESOURCE PLANNING AND ACQUISITION

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For Presentation
At The
German-American Workshop

Internalization of External Costs of
Electric Power Production and Utility Acquisition
Ladenburg, Germany
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METHODS FOR VALUING AND INCORPORATING ENVIRONMENTAL COSTS IN ELECTRIC RESOURCE PLANNING AND ACQUISITION

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Electric power resource planning and acquisition practices in United States and many other countries consider a limited range of factors such as price, fuel diversity, reliability, etc. for achieving desirable results. This selection process often neglects the value of public goods consumed by the energy projects, and thus fails to make optimal choices for the society at large. For example, a fossil-fueled power plant consuming a greater quantity of air and water resources than a renewable energy resource may be chosen if the selection process is based mainly on the delivered price of power. To the extent that any project consumes public goods or uses public subsidies, the societal values of those goods and subsidies become external factors and neglecting their values in the decision processes leads to making suboptimal choices for the society. In the case of publicly owned and operated utility systems in which no direct private profits are involved, incorporation of external factors in the resource acquisition process is an internal decision and can be accommodated once proper values are established for externalities. In the case of privately owned but regulated utility systems such as those in United States, incorporation of external factors in resource planning is not as easily accomplished because the market values for public goods are not readily determined and the use of estimated values in resource selection is resisted by the private investors whose profits may be adversely affected. In the latter case, government regulators must work with the regulated utilities in finding acceptable methods for valuing public goods in electric resource planning and acquisition. For example, the utility investments on demandside management measures may be in the best interest of the society but implementation of those measures which cut utility sales and profits are resisted by the utility investors. Despite these difficulties, many regulatory commissions in the United

States believe that some policy changes to the traditional scheme of regulation (in which utilities' incomes are generally based on sales and capital invested) can be made and market based policies similar to those pursued in other industrial sectors can be adopted to capture competitive market efficiencies. It is believed that given its power, free market forces will harness innovation in the utility sector to develop environmentally benign resources ultimately leading to long range cost reductions to ratepayers.

While the regulatory support for competition in the utility sector offers unprecedented opportunities for aggressive private power producers and the ratepayers to capture market efficiencies, successful implementation of competitive bidding for acquiring future resources requires the utilities and regulators to work together in devising a common measure to value price and non-price attributes for comparing electric resources. This paper discusses specific methods employed in New York State for measuring environmental values of electric power resource options and weights given to those values in the ranking methods adopted for application in the utilities' bidding programs.

CONSIDERATION OF ENVIRONMENTAL EXTERNALITIES IN ELECTRIC RESOURCE PLANNING

Environmental externalities of electric power resources are defined as the residual environmental impacts of projects after compliance with environmental standards and regulations. Residual impacts of electric power resource options differ considerably and impose costs on the society indirectly. Consideration of the values of residual environmental discharges in electric resource planning and acquisition offers a level playing field for environmentally clean resources to compete with others and provides private power producers with some incentive to minimize total cost (including the societal costs) not just direct cost in designing their projects.

Basic principles which guide consideration of environmental externalities in electric resource planning and acquisition can be summarized as follows:

- Environmental externalities are the residual environmental impacts of projects which meet basic environmental standards and regulations enforced by federal, state and local environmental agencies.

- Economic values of environmental externalities are the values placed by the society on the damages caused and the opportunities lost as a result of construction and operation of the facilities.
- Price and social cost of environmental externalities of electric power generation are inter-related and that reducing externality costs may increase price of electric power.
- Consideration of externalities costs in the price of electric power promotes fair competition in power generation and offers a level playing field for the bidders to participate in the utilities bidding programs for acquiring future capacity needs.
- Estimating the cost of damages caused by environmental discharges requires significant amount of time and resources and forces making value judgements on some issues which are difficult to quantify (ex: determining the damage caused by 1,000 tons of sulfur oxides and its economic value in urban areas versus in pristine areas such as national parks).
- Cost of eliminating the discharges of air and water pollutants and cost of mitigating residual land use impacts could be used as a surrogate for valuing the environmental externalities.
- Estimating mitigation costs of environmental residuals for projects which pass environmental standards and using those costs along with prices in valuing the resource options forces utility planners to consider the values of public resources in designing their project proposals.
- Energy conservation projects which reduce consumption of electric energy offer environmental benefit proportional to the value of environmental externalities associated with the amount of electric generation avoided.

METHODS FOR VALUING ENVIRONMENTAL COSTS

Several methods were identified for valuing air pollution emissions based on (1) utility cost of controls, (2) marginal cost of control and (3) damage cost imposed by the emissions.

The utility cost of controls refers to average cost of reducing its total emissions to achieve a target level. For example, if a utility is required to reduce its sulfur dioxide emissions by 10,000 tons, it would most likely achieve that target by using least

cost methods such as switching to lower sulfur fuels, installing flue gas desulfurization (FGD) controls, implementing load reduction through energy conservation programs or through a combination of several methods. In this case the utility would value emissions reductions achieved by any other means in its region equal to the cost of achieving the same at its facilities. A method for valuing emission reductions for meeting specific target levels is discussed in New York State Energy Plan 1989. Marginal cost of control refers to the cost of reducing the last unit of emissions when a utility attains its target level of emissions. Barnow and Marron (1990) and Chernick and Caverhill (1989) provide justification for valuing emission reductions at the marginal cost in electric resource planning which are more expensive than those methods available to the utilities at the average cost. Damage cost refers to the cost of damages to public health and resources caused by the environmental discharges. Ottinger et al (1990) and Homeyer (1988) provide good discussion on damage costs of environmental externalities of electric resources.

While the economic cost of air emissions may be close to the damage costs imposed, it is not clear whether society values those costs based on global damages or limit those values to damage costs to the local population and its resources. Estimating damage costs requires site specific information on local conditions such as population density, distribution of public and private resources, and meteorological data which are difficult to obtain and making judgements on the value of affected human lives and public resources which are difficult to quantify. Use of damage costs in valuing resources presents additional problems as it would bias the decision to locate sources in less populated rural areas where the total damage costs may be lower but damage to any one person could be larger than if the source is located near an urban area. This method certainly would not offer equal protection to individuals in urban and rural areas. Given the significant difficulties for estimating damage costs and the equity problems that question their use in valuing externalities, many analysts have chosen to use control or mitigation costs as shadow prices for the externalities.

ENVIRONMENTAL COST OF A REFERENCE (BENCHMARK) COAL PLANT

In approving procedures for conducting competitive bidding programs by the electric utilities, the New York State Public Service Commission (NYPSC) revealed its preference to use environmental mitigation costs at existing facilities as shadow prices for valuing societal cost of environmental discharges from future resources. The rationale for using average utility costs as shadow prices is provided in Putta (1990). New York identified the residual environmental intrusions from a reference plant--a new coal-fired generating facility meeting bare minimum legal requirements--in three major environmental categories namely air emissions, water pollution discharges and land use impacts. Average cost of controlling emissions at operating facilities for meeting some specified targets were estimated and were used as shadow prices to value the societal cost of residual emissions from new resource options. For carbon dioxide emissions New York assigned social cost equal to the cost of reforestation necessary to sequester the residual emissions and revealed its preference to offer 20 percent of that cost as credit towards the price for sources which do not discharge CO2 emissions and proportionately less credit for sources which emit less CO2 than the reference plant. For water pollution discharges and land use impacts, New York examined the available studies on valuing the social costs and assigned a maximum of 0.1 cents/kwh for water discharges and 0.4 cents/kwh for land use impacts of the reference plant. The societal value of environmental externalities adopted in New York State for power resources are summarized in Table 1. In assigning the values for societal cost of environmental externalities, New York recognized the limitations and accuracy of the information used and fostered a research study to estimate values of externalities and develop methods for incorporation of more accurate values in future resource planning and acquisition.

METHODS FOR INCORPORATION OF ENVIRONMENTAL COSTS IN RESOURCE SELECTION

While determining the economic value of environmental features is one of the most difficult problems faced by the utilities and the regulators in comparing electric resource options, the utilities are also confronted with developing a common measure to consider environmental costs along with other relevant factors--both

price and non-price features--for ranking the resource options. Often, the common measure for comparison of projects is achieved by developing a scoring method in which the price and non-price factors are allocated maximum scores based on their economic values. For example, a utility may decide to offer a maximum score of 100 points which may be awarded to a project whose price is 50 percent below the utility's bench mark price--its avoided cost. Such an offer implies that each percent of avoided cost is worth two points. The same measure is used for allocating scores to other factors based on their economic values. The relevant factors considered for valuing electric resource options generally include:

- Delivered price of power
- Dispatchability of the project
- Reliability of technology
- Project viability
- Fuel choice and flexibility
- Environmental value

Each of these factors have some economic value to the utility proposing capacity additions. For example, if a project which is fully dispatchable, i.e., it permits the utility to vary its load according to its needs without any restrictions has a value equal to twenty percent of the utility's posted benchmark price, then the dispatchability factor will be allocated a maximum of forty points in the scoring method. Similarly, if the environmentally most desirable project is worth 25 percent of the benchmark price, the environmental factor will be allocated 50 points and the project's whose environmental value falls below the maximum will be scored according to their relative environmental values. The score allocated for the environmental factor would then be distributed for the environmental subattributes such as air emissions, water pollution discharges and land use impacts of energy resource options based on estimated environmental costs of those attributes for a benchmark resource option such as coal burning power plant that meets the minimum legal standards. A detailed discussion of weighting environmental externalities is provided in Putta (1989).

Under this system of scoring, environmentally benign sources, such as energy conservation measures, would earn the maximum score allocated for the environmental attributes. A coal plant that barely passes State environmental reviews would receive zero score for

environmental attributes. The environmental score for all other projects is determined using an Environmental Scoring Form (ESF) which provides scores for all relevant environmental attributes based on their economic values. The ESF form (Table 2) adopted for use in one of New York's utility bidding programs illustrates distribution of environmental score for many environmental attributes. Using the ESF form, the score for each attribute is obtained by multiplying the number of points earned and the weight attached to them and the total of all scores becomes the environmental score of the project.

METHODS FOR RANKING RESOURCE OPTIONS--IMPLICATIONS

Selection of resource options for meeting future capacity needs of a utility greatly depends on the maximum scores allotted to the price and non-price factors and the methods employed for ranking the options. Since methods for scoring and ranking energy resources are not fully developed and tested in practice, it is important that the regulatory policies which influence utility actions be aimed at driving innovation for developing efficient methods by the utilities and refrain from prescribing solutions. Guided by these thoughts, the New York Commission offered its utilities complete freedom to design methods for scoring and ranking resource options and the utilities seized upon the opportunity to devise different methods which suit specific preferences in their franchise areas. A majority of the utilities proposed methods in which all price and non-price factors are scored and the resource options are ranked based on their composite scores. In a few cases, the utilities proposed to score only non-price factors which are used to adjust the price and the energy projects are ranked based on the adjusted prices. In all cases, the ranking methods developed by the utilities fall into the following three major categories:

- Arithmetic method
- Multiplicative method
- Net Present Value (NPV) of adjusted price method.

Arithmetic method:

In this method, the projects are ranked based on the sum total of scores on price and non-price factors and the projects receiving higher ranks are chosen for meeting the utilities future capacity needs. A majority of the utilities have adopted this method as it is simple to administer and the effect of the price and non-price scores in ranking of the resources can be easily analyzed. One disadvantage of this method is that it allows projects with very poor or zero scores on certain factors to rank high based on total score. For example, a project with a zero score on environmental factor or on dispatchability factor could conceivably receive a high rank if it scores high on price and other factors. This problem is corrected by specifying threshold features which must be met by the projects before the utilities consider them in the resource ranking. Some of the threshold values could be such as (a) price shall not exceed 125 percent of the utility's avoided cost, (b) the project shall be dispatchable by the utility at least 50 percent of the time.

Multiplicative Method:

In this method, the resource options are ranked based on their product scores which are obtained by multiplying the sub scores received by the projects on price and non-price factors. This method of ranking has the effect of penalizing project designs or technologies which score low on any one factor. For example, a project which scores high on many factors but scores low on environmental factor or another non-price factor will receive a low multiplicative product and will be ranked low compared to projects which score average or above average on all other factors. This method adopted for use in one of the utilities bidding programs in New York will be analyzed for its effectiveness in attracting efficient projects when the results of the bidding will be announced in early 1991.

Adjusted Net Present Value (NPV) Method:

In this method, all resource options are ranked based on NPV of total overall adjusted cost of the proposals. First, the prices of the proposals are adjusted for energy output, availability,

transmission and distribution and administrative costs. Then non-price adjustments to the price are made using the values placed by the utility on non-price factors. The non-price factors include a general category of features such as fuel diversity, reliability, risk and operational characteristics and an environmental category such as air, water and land use impacts. Projects which have best non-price features receive maximum non-price adjustment which will be subtracted from the price before the NPV of the project is calculated. The utility will decide the maximum values to be allocated for the non-price factors based on their perceived economic values in its franchise area. For example, if the economic value of environmental benefits of a benign resource option such as an energy conservation project is worth 1.4 cents per kilowatt hour of energy saved, that amount of adjustment would be made to its price in calculating its NPV. For other proposals which have less environmental benefits, only a fraction of the full 1.4 cents/kwh benefit will be provided. That fraction is calculated by dividing the project's environmental score with the maximum score allocated for the environmental factor. In using the NPV method, one New York utility valued non-price features at about 50 percent of its avoided cost which is credited for projects receiving perfect score on non-price factors. This non-price credit which is equally divided between the general non-price features and environmental features encourages design of projects with cost effective non-price features and the resulting higher prices would not disadvantage them from competing with low priced projects which process poor non-price features.

The effectiveness of the NPV ranking method in attracting environmentally superior projects and the difficulties in administering the method will be examined when the evaluation of the utilities bidding programs are completed and the results are announced in early 1991.

CONCLUSIONS

The advent of competitive bidding for acquiring electric resources heightened the need for considering values of environmental externalities in comparing resource options. Since the price and social cost of environmental externalities of electric power

generation are related and that reducing externality costs may increase the price of electric power, comparing resource options require methods for valuing externalities and considering them along with other relevant factors. Methods for moneytizing externalities were discussed and a practical method for valuing externalities and scoring resource options in competitive bidding programs was recommended. Several ranking methods for considering the environmental score along with other relevant factors were discussed and their advantages and disadvantages in resource selection were identified.

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TABLE 1

ENVIRONMENTAL EXTERNALITIES OF A BASE COAL PLANT

ADOPTED IN NEW YORK BIDDING PROGRAM

Pollutant	Control Cost $/ton*	NSPS Coal Plant Emission rate lbs/MWH	Average Cost of Control cents/kwh
SO_2	832	6.0	0.25
NO_x	1832	6.0	0.55
CO_2	1.1	1820.0	0.1
TSP	333	0.3	0.005
Water Pollutants			0.1
Land Use Impacts			0.4
Total value of Environmental Externalities			1.405 ¢/kwh

* Based on application of 80% ACT and 20% LCT for SO_2
20% ACT and 80% LCT for NO_x
20% LCT for CO_2.

where ACT is Advanced Control Technology.
LCT is Low Cost Control Technology.

Table 2
Environmental Scoring Form (ESF) Case 88-E-242 Niagara Mohawk

Environmental Attributes	Weight (W)	Points (P) 0	1	2	3	4	5	Score (W x P)
Air Emissions								
Sulfur oxides (lbs./MWh)	7	>6	4.0-6.0	2.5-3.9	1.5-2.4	0.5-1.4	<0.5	
Nitrogen oxides (lbs./MWh)	16	>6	4.0-6.0	2.5-3.9	1.5-2.4	0.1-1.4	<0.1	
Carbon dioxide (lbs./MWh)	3	>1500	1050-1500	650-1049	250-649	100-249	<100	
Particulates (lbs./MWh)	1	>0.3	0.2-0.3	0.1-0.199	0.05-0.099	0.01-0.049	<0.01	
Water Effects								
Cooling water flow (Annual intake as % of lake volume)	1	80-100	60-79	40-59	20-39	5-19	<5	
Fish protection	1	None		Operational restrictions		Fish protection provided	No public water used	
NYS water quality classification of receiving water	1	A or better	B	C+	C	D	No water use or municipal water/ wastewater utilized	
Land Effects								
Acreage required (acres/MW)	1	0.3-0.5	0.2-0.29	0.1-0.19	0.05-0.09	0.01-0.05	<0.01	
Terrestrial	1	Unique ecological or historical value		Rural or low density suburban		Industrial area	No land used	
Visual aesthetics	1	Highly visible		Within existing developed area		Not visible from public roads		
Transmission	2	New OH >5 miles	New OH 1-5 miles	New UG >5 miles	New UG 1-5 miles	Use existing facilities	Energy conservation	
Noise (L_{eq} - background L_{90})	2	>5-10			0-4.9		<0	
Solid waste disposal (lbs./MWh)	2	>300	200-300	100-199	50-99	10-49	<10	
Solid waste as fuel (% of total Btu's)	1	0	1-30	31-50	51-80	81-90	91-100	
Fuel delivery	1	New RR spur	Truck & existing RR	New pipeline	Barge	Use existing pipeline	No fuel use	
Kilometers from sensitive receptor area (per 6 NYCRR 225.1.1 (b)(4))	1	<10	10-39	40-69	70-100	>100	Energy conservation	
						Total Score (210 Max.)	=	

Mr. WILLIAMS. In fact, we have developed some literature that takes out of the proceeding the specific explanation to make it as comprehensible as possible.

But basically what we have done is, as Jim initially indicated, that we have assigned a certain value for the cost of SO_2, and another value for the cost associated with water pollution, and another value—as a result, bear in mind, of very careful studies in each of these areas. And we have added these all up and it added up to 1.4 cents per kilowatt hour, and that is the cost that has to be included in the calculations of the various bids to assure that then they are all evaluated in an equitable fashion.

Mr. WOLF. In other words, Mr. Chairman, you look up from the particular source, and you see, well, how much SO_2 came form this source, how much CO_2, how much water pollution, and then you add up those individual components. And if it was overall the most polluting source it would wind up to be 1.4 cents. So the 1.4 has all of the different weight elements in it. Then you look at each individual source and say, how much does this particular energy source have of the mix? It has nothing, then it gets a zero value.

The CHAIRMAN. Well, how would you deal with geothermal, and how would you deal with nuclear, for example?

Mr. WOLF. Well, nuclear, for example, as I understand would have none. It would have zero on the carbon dioxide weighing.

The CHAIRMAN. What would they have?

Mr. WILLIAMS. Well, for each of these different sources, there is—each utility has submitted a very careful plan or process whereby this process will be invoked. For example, they include so many points to take into account the amount that a particular applicant—for example, PG&E has submitted a proposal to build a gas plant in New York, PG&E-Bechtel. So that will be evaluated in terms of how much does that pollute, and you get so many points that subtract from the whole score.

The CHAIRMAN. I understand that, but I am just saying it has got to be totally subjective.

Mr. WILLIAMS. But, Mr. Chairman, what I submit is that as a result of the very careful and lengthy process involving evidence and proceedings and scientific analysis, and a legal decision by the legally-established body in New York, we have said, this is it.

The CHAIRMAN. But that does not make it nonobjective.

Mr. WILLIAMS. I might have been subjective on the way in, but it is not subjective on the way out.

The CHAIRMAN. I understand that. I takes a subjective valuation and puts a number on it. Now, I understand SO_2 and NO_x, that is, you know, we evaluate that here too in the Clean Air Act. But there are other things that—if you do not like nuclear, you say, well, they are going to have to spend a lot of money for waste out in Nevada.

Mr. WILLIAMS. Noise is a particularly troublesome issue, because with a gas plant, for example, you have a compressor. Well, how much do you take into account the noise factor to determine that noise is more of a problem in comparing a plant that is less noisy. And how do you relate, then, the fact that one plant is relatively noisy, but very clean in terms of the emission of SO_2, whereas another plant has relatively high SO_2 and is not noisy?

Well, what I am saying is that the process that we have identified puts all those into a way that they can be compared in a rational manner.

The CHAIRMAN. Mr. Watson, on page 6 of your testimony, you State that the Federal Investment and State Assistance Program, such as weatherization in schools and hospitals is returned many times over. Are there independent studies that estimate the energy savings that have resulted from these programs?

Mr. WATSON. We have done surveys of programs operated by States. There are obviously a wide range of different kinds of programs and different kinds of returns, but generally speaking these are all operated on a positive pay-back basis and do return savings in excess of their cost.

The CHAIRMAN. Well, I was here when we put that program together and, in theory, it is certainly an excellent program. You say you have looked into them, but you are hardly noninterested. Are there any independent studies, and how would the independent studies go about doing those, I guess, at random? But there are no independent studies.

Mr. WATSON. Off the top of my head I am not aware of an independent study. Maybe I will be corrected quickly.

Mr. SKLAR. I also know the State of Florida has done some work on conservation and solar in schools and hospitals, and we will get that to you. The Florida Solar Energy Center, State of Florida, we will get that to you.

The CHAIRMAN. I mean, there is great potential for doing conservation, and a well-run program can be very good, but the question is, how many programs are well-run, and how do we know? In a lot of these areas, the home weatherization is considered to be a jobs program more than an energy conservation program. And, you know, there is all this money going in there and we do not have the foggiest notion of whether it is just going off into the ether somewhere or whether it is really being spent well.

Mr. WATSON. I would appreciate the opportunity to supply your staff with some of the evaluations of programs and projects that we have done in our State, and I think you will find that they do show a positive return to the investment that the Federal Government has made there. The investment criteria that we use are ones which ensure that we are going to get a positive return, and——

The CHAIRMAN. I am quite sure that these programs can be good, and your State has been one of the leaders if not the leader in the Nation. I am wondering about all of these other States, whether they do not particularly care about the program and they just dump the money out there to be spent.

Mr. WATSON. From my experience, that is not the typical situation. The States are committed to energy efficiency. They are aggressive and——

The CHAIRMAN. How do we know that?

Mr. WATSON. Well, I think it would be useful for you, and we will provide you with assessments that we have done——

The CHAIRMAN. I have asked DOE to perform its auditing on that in the past, and they have not done it. We are spending hundreds of millions of dollars in this area. We do not have the foggiest notion. I know in my State they wanted to take that money and

put it on the deficit. They had a big deficit. And I rather guess in my State it is being wasted. I do not know that. I do not know that anybody knows.

Mr. WATSON. Well, I in fact have here some examples from the State of Louisiana, if I can put my hand on them quickly. They are good programs. Louisiana—the State has awarded over $15.6 million in ICP grants. Typically, the grantee has performed boiler replacements, lighting retrofits, installed energy management systems. An example is East Baton Rouge Parish School Board received a $365,000 grant for energy efficiency improvements.

The most recent calculation of energy savings documented nearly $455,000 in annual energy savings. This is the State of Louisiana. This is the energy office in the State of Louisiana. This is a good professional energy program.

The CHAIRMAN. When you award a good contract it is easy, I guess to be energy efficient, more so, I guess than on a residential—not that—I mean the awarding of the contract does not mean that you get the payoff, but if you do have a big contract awarded, it is easier to look at than just a lot of people employed with a lot of money going through. I am not saying we should not have these programs. I was here when we established them. I voted for them. I think I was acting as chairman at that time, if I recall correctly.

I am just saying that we need a way to have performance auditing year by year on programs all across the country and we do not have that. They may be good, and we might be able to show by that performance auditing that this is the greatest payoff we have in energy conservation. The potential, and I know in these home that have big cracks in them and the wind blows through in the winter time, the potential is tremendous there. The question is whether there is delivery, whether there is performance. And that is my concern. And I think maybe we ought to put something in here.

Mr. SKLAR. Mr. Chairman, you are right in that you need big bang for the buck conservation and energy efficiency improvements. And I think one of the things you have helped us with your other hat on the appropriations subcommittee, is too on the solar water heating side, both institutional and in homes, is to get them rated, and not only get them rated in terms of their performance, but also compatibles, so that you can have an installation standard so that you can make sure that in fact they are installed properly. So you are saving the energy. And that is key.

And if you do not have bang for the buck in these things, it is not worth doing.

The CHAIRMAN. I would invite any of you who have a particular interest in this field, including Mr. Davis, to give us any suggestions in writing on first of all, do we know now, and if we do not, how can we better find out in these fields that we are successful and that the money is being well spent.

Mr. WOLF. Mr. Chairman, we are helping. And the Department of Energy is now conducting an evaluation of the weatherization program with the National Laboratories, and that is under way.

The CHAIRMAN. What is the methodology.

Mr. WOLF. I know that Oak Ridge National Laboratories has helped us on that methodology, but I am not familiar with the spe-

cifics myself. But we have been part of the meetings to help design the initial review.

The CHAIRMAN. I am very, very glad to hear that. That is precisely what we need.

Mr. WOLF. And the other point, Mr. Chairman——

The CHAIRMAN. I gather we will not get the results of that in time to put it in here, but if it is being done, we can correct it a later time.

Mr. WOLF. Also on the ICP program, Mr. Chairman, I remind you one of the indications of the cost effectiveness is—remember that is a cost-shared program, so the recipient, whether the school or hospital does have to put up a significant portion, 50 percent of the funds.

The CHAIRMAN. I am not really so much worried about schools and hospitals, although there may be some problem in picking the schools and hospitals, you know getting the right candidate—I do not know how they do that. But any comments along that line, I guess this study will reveal.

Mr. Williams, in your statement you say that this bill lacks measures that would produce real savings, but then you go on to stress that section 3201 must not interfere in State authority. In section 3202, regarding home energy ratings must be voluntary, and then you also oppose PUHCA. We will not talk about PUHCA at this time, you have got a separate hearing on that, but would you speak to the interference in State authority and the voluntariness of the energy ratings?

Mr. WILLIAMS. One of the fundamental concerns that the NARUC organization has had is the integrity of the State regulatory process, particularly to ensure that State regulatory commissioners have the ability to encourage least-cost planning and energy conservation and all of the things that are associated with the concept of integrated resource planning in ways that reflect the particular circumstances in a given State. And our concern has always been that if we establish a single mold and try to cast all the States into that mold, we do not recognize that there are different social and economic perspectives that the various States have.

So what we want to do is make sure that that kind of flexibility is maintained. And as long as we have that, then you see we can foster the creativity that you referred to earlier and achieve the kind of flexible approaches that the different States might be able to bring to the overall problem.

The fundamental thing, however, is that results have got to be demonstrated. And this is why the discussion just forgoing, focusing upon what has the investments produce, is very relevant. And that is why I said earlier the activities in which we are currently engaged with DOE focusing on evaluation and verification are very, very important to insure that these investments are producing the kind of returns that we say they are.

The CHAIRMAN. Mr. Sklar, you state that we have got 8,000 nonhydro solar megawatts. How is that made up of?

Mr. SKLAR. We have 2,600 megawatts of geothermal in the United States now, 1,600 megawatts of wind, a little over 3,000 megawatt of direct combustion biomass, mostly wood waste, and——

The CHAIRMAN. Does that include paper plants?

Mr. SKLAR. Yes, that does include paper plants. But in fact the direct combustion side is really moving more into smaller, 30 megawatt plants. And 400 megawatt of solar thermal. And then the rest are sort of divided between anaerobic digestion, photovoltaic, some of the smaller technologies.

The CHAIRMAN. And how much do we have of solar right now?

Mr. SKLAR. Right now on the electric generating grid, we have about 400 megawatts, most of that is solar steam to electricity in California. But I would like to point out that over the next 5 years, you will have over 1,000 megawatts of solar steam plants and some of that outside of California.

The CHAIRMAN. Yes, our amendments to PURPA are meant to help that along.

Mr. SKLAR. Oh, absolutely. It was great help.

The CHAIRMAN. It also will help the geothermal a great deal. I understand the geothermal resource is tremendous in the west.

Mr. SKLAR. Absolutely. It is profound. And that is the point, is that by you helping us in just accessing the market a little more with these technologies, we will be able to expand greatly in this decade.

The CHAIRMAN. Well, gentlemen, that is all the oral questions I have. I will submit some written questions for the record. We do solicit your additional written comments on anything that has gone on here today or anything that comes to mind or any drafting of any particular provision. We want to make this just as strong as we can—the alternatives and conservation provisions consistent with good sense. And we want to strengthen it from the point it is right now. So you can be of immense help, and you already have been.

We thank you very much for your testimony.

[Whereupon, at 12:35 p.m., the hearing adjourned.]

[The following statements were submitted for the record on February 26, 1991:]

PREPARED STATEMENT OF JARED O. BLUM, PRESIDENT, POLYISOCYANURATE INSULATION MANUFACTURERS ASSOCIATION

The Polyisocyanurate Insulation Manufacturers Association ("PIMA") is pleased to submit this statement in support of S. 341, the National Energy Security Act of 1991, introduced by Chairman Johnston and Senator Wallop on February 5.

PIMA's members are manufacturers of one of the most effective forms of insulation available for residential and commercial applications. Our rigid foam insulation board represents the state of the art in terms of energy efficiency, which is a significant reason why our product is used in over 60 percent of new commercial construction and approximately 50 percent of residential construction. As a result, our contribution to a "Made-in-America" energy policy is substantial. DOE figures suggest that our product's superior energy efficiency attributes will save approximately 60 million barrels of oil in commercial and residential buildings over their lives, 60 million barrels more than what would be saved with less efficient measures.

Mr. Chairman, PIMA is 100 percent behind your bipartisan effort to reduce our dependence upon imported oil. As you observed upon the introduction of S. 341, "the world is now at war in large part because much of the world economy, especially including our own, relies on the Persian Gulf for supplies of oil". We have now committed our most precious resource, the lives of our nation's men and women serving in our armed forces, to, among other objectives, securing our access to energy supplies. This ultimate sacrifice requires nothing less than an absolute pledge by all of us, government and the private sector, to do everything we can to use energy in the most efficient manner possible.

As I indicated on January 7 in a letter to you and your committee colleagues (attached), PIMA fundamentally disagrees "with those who argue that the marketplace, and the marketplace alone, should determine the extent to which our nation conserves vital energy resources". As businessmen and women, PIMA's members obviously recognize the preeminent role of the marketplace. Yet, we are equally cognizant of when market forces are not reflective of our societal requirements. Clearly the price of an imported barrel of oil, today under $20, fails to reflect its true cost to us as a society. And it is equally clear that the marketplace—in the case of builders of residential or commercial buildings—offers very little, if any, economic incentive to construct structures that maximize energy efficiency. In fact, what economic incentive there is, at least in this instance, works against energy efficiency.

Accordingly, we were particularly heartened to read in the administration's "National Energy Security" document the statement that:

> "There is also a role for effective federal leadership—in cooperation with private industry, utilities, and state and local governments—to help overcome specific market barriers and to help ensure that cost-effective energy-efficient . . . technologies are applied where they can be."

This statement strongly suggests that Congress and the administration will be able to achieve a consensus on the vital role of government in ensuring the maximum penetration of energy efficiency measures.

S. 341 recognizes the "key" role of energy efficiency in achieving what is now not merely a national objective, but a national imperative. Fittingly, it is the first substantive title in your bill. And it is equally fitting that improving energy efficiency in our residential and commercial buildings are the first sections in title III. These two sectors alone account for approximately 35 percent of our primary energy use. Importantly, achieving significant energy reductions in these areas does not require a technological breakthrough, but merely the application of existing, proven, cost-effective measures.

As your bill correctly identifies, it is imperative that, at a minimum, DOE and HUD work together to ensure that federal buildings and housing constructed with federal mortgage monies meet stringent federal efficiency standards. It is equally important that states be given every possible incentive and assistance to adopt standards that meet or exceed such national standards. In addition, PIMA believes S. 341 appropriately includes residential energy rating systems as an important potential contributor to energy efficiency.

In conclusion, PIMA applauds the bipartisan effort represented by S. 341 to ensure that our nation's response to the critical threats posed by our prolific use of energy threats to our national security, environment, and economy—are forcefully addressed by a comprehensive national energy efficiency program. Our members look forward to working with you and your colleagues in developing the final details of such a program and in securing its passage.

[Attachment.]

POLYISOCYANURATE INSULATION MANUFACTURERS ASSOCIATION,
Washington, DC, January 7, 1991.

Hon. J. BENNETT JOHNSTON,
Chairman, Energy and Natural Resources Committee, U.S. Senate, Washington, DC.

DEAR MR. CHAIRMAN: On behalf of the Polyisocyanurate Insulation Manufacturers Association ("PIMA"), I am writing to urge your support for strong and comprehensive energy efficiency legislation in the 102d Congress.

As major manufacturers of one of the most effective forms of insulation available today for residential and commercial applications, our industry believes that the federal government can, and must, play an active role in promoting energy efficiency. We thus disagree with those who argue that the marketplace, and the marketplace alone, should determine the extent to which our nation conserves vital energy resources.

As recent events have made clear, the price of energy fails to reflect its true cost to us as a nation: it does not reflect the costs to our nation of our current commitment in the Persian Gulf; it does not reflect the growing concerns regarding our environment; and finally, it has never reflected the long-term debilitating effect energy imports have on our economy. These external costs are all too real, and our nation's public policy response must take them into account.

PIMA asks you and your committee colleagues to give favorable and early consideration to a broad range of measures designed to promote energy efficiency, including, but not limited to, measures which would:

> Require DOE to encourage and provide incentives for states to adopt, at a minimum, energy efficiency standards for residential buildings equal to the

most up-to-date version of the Council of American Building Officials' Model Energy Code ("CABOMEC");

Require DOE to encourage and provide incentives for states to adopt, at a minimum, either DOE's voluntary standards for commercial buildings or the most recent standard adopted by the American Society of Heating, Refrigerating, and Air-Conditioning Engineers ("ASHRAE"), whichever achieves greater energy savings;

Require states to consider incentive mechanisms, such as utility connection policies, rebates, and home mortgage incentives, applicable to builders that exceed either the CABOMEC standards for residential buildings or the ASHRAE or DOE voluntary standards for commercial buildings;

Establish federal guidelines and a federal support program for energy efficiency ratings for new and existing residential buildings;

Require new federal buildings to meet more stringent energy efficiency standards and establish more ambitious savings targets for existing facilities;

Enable utilities to profit from energy efficiency investments by requiring state utility commissions to consider reforms of utility regulatory practices;

Require the calculation of the cost-effectiveness of energy efficiency measures federal guidelines, such as those issued by the National Institute for Standards and Technology, to include a quantification of the external costs associated with fossil fuels; and

Revise the existing low-income energy assistance programs to direct a greater portion of resources to weatherization measures, thereby ensuring a permanent reduction in energy use.

PIMA believes that each of the above measures would advance our nation's goal of reducing energy in a cost-effective and societally acceptable manner. In our judgment, strong energy efficiency measures should constitute an indispensable element of our public policy response to the threats posed by global warming and global instability.

PIMA would be pleased to discuss these measures, and specific language, with your staff, and stands ready to assist you in any way in securing support and passage of a comprehensive energy efficiency legislative package.

Sincerely,

JARED O. BLUM, *President.*

PREPARED STATEMENT OF THE NATIONAL ASSOCIATION OF REALTORS

INODUCTION

The National Association of Realtors appreciates this opportunity to provide our testimony for the record on S. 341, "The National Energy Security Act of 1991." The National Association of Realtors, comprised of more than 800,000 members in all aspects of the real estate industry has a keen interest in the issue of home energy efficiency and we confine our comments to Title III of the bill which deals with that topic.

BACKGROUND

The National Association of Realtors has a long history of support for residential energy efficiency programs. Back in the late 1970's we offered educational materials to our members, including "The Realtors Guide to Residential Energy Efficiency: An Introduction in Using Energy to Sell Homes." That course and related materials were developed, in cooperation with the U.S. Department of Energy, as part of an educational program to enable the Realtors to understand and use energy efficiency as a selling tool.

The National Association of Realtors supports efforts to educate the home buying and selling public on the matter of home energy efficiency. In 1989, we cosponsored, along with the Alliance to Save Energy, a conference on housing affordability and home energy efficiency. That conference provided valuable information to real estate professionals, including information on the various home energy efficiency mortgage programs.

In 1990, we testified before this Committee on S. 1355, Senator Bumpers' bill, to create a uniform energy ratings standard system. The National Association of Realtors supports efforts, such as the Bumpers bill, to develop uniform energy standards for use by the housing consumer. However, we oppose efforts to make use of such standards mandatory and to impose the assignment of an energy efficiency rating to a residence as a prior condition to the sale of the property.

REALTORS POSITION

In 1989, the National Association of Realtors Board of Directors adopted policy regarding home energy efficiency and housing affordability. During debate on this issue before the Energy, Environment and Development Subcommittee of the Realtors Legislative Committee, much attention was focused on legislative proposals before Congress requiring mandatory energy efficiency inspections or audits prior to purchase. There was a strong consensus that any attempt to address the issue of energy efficiency should be done on a voluntary basis, rather than requiring mandatory energy ratings or audits to be done during a real estate transaction. We feel that such a requirement will only add to the cost of the transaction, making the home less affordable, since the cost will ultimately be passed on to the purchaser. We oppose adding costs to the transactions process since, especially in the case of first time home buyers, the purchaser is already severely strapped for cash for the down payment and closing costs. This energy efficiency audit and attendant cost will only make it more difficult for the average American to afford a home. It may also delay the transaction process pending completion of the energy efficiency audit.

We are also concerned with language in S. 341 which seeks to, "ensure that the (energy efficiency) rating is prominently communicated to potential buyers and renters." This requirement, if enacted, would create both an ethical and potential liability problem for Realtors. Even though it may be required by law, many sellers may choose not to have the energy efficiency audit done, or else choose to try and conceal a poor audit result from potential buyers. As you know, Realtors generally represent the interests of the seller in the real estate transaction process. However we have an ethical and moral obligation to treat all parties to the transaction fairly and to reveal all known material facts. Under our Code of Ethics, the Realtors would be required to communicate to the potential buyer that he or she was aware the seller was attempting to conceal a less than favorable rating. Under S. 341, would a seller have a cause of action against a Realtor if such information was revealed without his consent? Also, is it the intent of the legislation that Realtors inform sellers of their responsibility to have the audit done prior to sale, or that Realtors inform potential buyers that the audit should have been performed and was not?

At the National Association of Realtors 1989 Mid Year Business Meeting, the Board of Directors approved the following policies dealing with energy efficiency and housing affordability:

Relax underwriting guidelines for efficient new homes in the FHA and VA programs;

Ease the inclusion of energy improvements in mortgages. Each secondary market program has provisions for including costs of energy measures in mortgages, however these policies are all different. The federal government should address the problem and make an effort to educate the real estate industry and consumers about this option;

Provide financing and incentives for energy investments in housing assistance programs by including energy efficiency investment incentives in housing finance programs. In rehab loan programs, treat funds used for energy measures as grants or deferred interest loans, repayable on the sale of the building. Encourage builders to go beyond minimum building code energy efficiency requirements by offering incentives, such as special interest subsidies;

Foster the development of energy service companies for housing which would provide a complete package of analysis, installation, financing, and maintenance service;

Make changes in local rent control laws to encourage energy efficiency. Owners should be allowed to include debt service as a pass-through for energy efficiency investments in rent calculations;

Create tax incentives for housing energy efficiency. Provide tax credits for buildings that meet energy efficiency standards in new and rehabilitated housing. Excuse tax-exempt bonds used for energy efficiency financing from current caps. Set shorter depreciation periods for energy efficient housing. Change the rules governing the use of low income housing credits to encourage energy efficiency in projects using the credit;

Increase energy efficiency in rental housing through better metering. Individual metering should be encouraged to promote tenant energy conservation and individually metered buildings should be encouraged to meet the highest cost effective energy efficiency standards;

Increase the role of energy suppliers in housing energy efficiency programs. Enlist utilities to administer home energy rating systems. Utilities could con-

duct ratings at the time of service connection (for new buildings) or account turnover (for existing buildings).

CONCLUSION

The National Association of Realtors supports efforts by this Committee and the Congress to improve the energy efficiency of America's homes. Consumers, regardless of whether they are buyers, sellers, or current owners, must have low cost, easily available and highly reliable information on energy costs and conservation, however home owner compliance should be voluntary in nature and should include programs to educate the public on energy efficiency. We believe this goal is best achieved through the use of uniform standards and the voluntary programs we suggested to you in our testimony and we strongly oppose any efforts by the government, be it federal or state, to mandate energy conservation though audits or inspections at the time of purchase. The Realtors stand ready to work with this Committee to achieve the goal of reducing Americas energy use while lessening the cost of operating a home for the average American.

PREPARED STATEMENT OF MEG POWER, PH.D., NATIONAL COMMUNITY ACTION FOUNDATION

Mr. Chairman, as the representative of the nation's 960 Community Action Agencies which annually deliver nearly $400 million worth of energy conservation services to America's low income families, the National Community Action Foundation would like to propose several additions to this ambitious blueprint to increase energy efficiency in housing stock. For the poor, housing affordability is, of course, a major obstacle to a decent life, and energy efficiency means more affordable housing.

The Title III programs in the bill should be expanded to include at a minimum, the following policies:

Building efficiency standards: new public housing construction is not a very large part of the low income housing stock. Retrofit standards should be developed by the DOE Weatherization Program with HUD and should be used for all federally assisted units. Use of federal housing operating funds for energy investment must be encouraged, and the savings must be reinvested in reducing low income housing costs. Conversion to individual metering should be permitted only after weatherization.

Residential energy efficiency ratings will not be of great benefit in changing the efficiency or affordability of low income housing. However, major energy savings opportunities exist in low income multi-family housing, and the benefits from such savings could both increase affordability for tenants and pay long term benefits to utility systems and landlords (or a public authority owning the building). The legislation should include a fund of $3 million per year for the planning, advocacy and management of utility—weatherization agency partnerships in conservation investments for low income housing. Currently the local programs lack the resources to spend the months required to bring such partnership to fruition.

Further, the legislation should establish a policy of interagency cooperation between HUD and DOE assuring that the expertise of the Weatherization network and the funding available for HUD for low income housing maintenance and rehabilitation are used in concert. Current agreements seem to have reversed the relationships.

Second: The State Regulatory Authority grant purposes must include consideration of low income housing stock issues and the analysis of the energy economics of the low income sector in cooperation with the State Weatherization program.

Third: The local Weatherization and LIHEAP Conservation Programs should consider the cost effectiveness of natural gas installations each time a non-natural gas heating system is replaced.

Fourth: The expansion of the E.I.A. data base should not only include a biennial Residential Energy Consumption Survey, but a substantially expanded low income household sample in the survey so that valid conclusions about future energy policy can drawn on a regional and housing market basis.

Last: The technology transfer strategies should include a clearinghouse for information and training administered by and for the local and state Weatherization network to (1) share technical information and adapt energy evaluations and energy saving measures developed one market to other, new areas and to

provide direct training; (2) support participation in least-cost planning to assure the low income housing stock issues are analyzed and considered and (3) provide legal, and technical support to non-profit agencies undertaking public-private partnerships in low income housing energy conservation ventures. This should be budgeted at $2 million a year.

Mr. Chairman, while we await the completion of the Department of Energy's first comprehensive evaluation of Weatherization, we can still demonstrate that this program is saving energy, preserving the housing stock and having a major impact on housing affordability.

The Department of Energy submitted a report to the Senate Appropriations Committee last year showing that many agencies' now achieve 25% annual energy savings using the most state-of-the-art techniques. This translates into a 5.9 year simple payback. While not all state and local programs are yet using comparably effective techniques, the Department's report points out DOE Weatherization is continuing to develop rapidly in this direction, and that the trend in state programs is this dramatic gain in efficiency since the legislative changes in the program in 1986. As DOE submitted this report as a companion to their zero-budget request, it stands as the most negative commentary they found it in their power to give. Yet, it contains highly favorable findings. A copy of the transmittal letter summarizing the report is attached for your Record.

Under the terms of the State Energy Efficiency Programs Improvement Act of 1991, the program will be unshackled from technological constraints imposed by the previous act and will serve as an even stronger weapon in the struggle to achieve national energy security.

Thank you for your consideration of these views.

PREPARED STATEMENT OF INTERNATIONAL DISTRICT HEATING AND COOLING ASSOCIATION, WASHINGTON, DC

ENERGY EFFICIENCY AND ENVIRONMENTAL PROTECTION THROUGH DISTRICT HEATING AND COOLING

District heating and cooling (DHC) systems provide thermal energy from one or more large, efficient, environmentally-controlled plants rather than from many small plants. Thermal energy is delivered in the form of chilled water, hot water or steam, from the central plant or network of plants to individual buildings to provide space heating, air conditioning, domestic hot water or industrial process energy.

DHC systems can provide many benefits to local communities and the Nation:

1. Increased energy efficiency
2. Reduced CFC use
3. Reduced air pollution, including carbon dioxide
4. Opportunities for utilization of renewable energy
5. Opportunities for local economic development
6. A tool for managing electricity demand
7. Increased fuel flexibility and energy security

Energy Efficiency

DHC improves energy efficiency in many ways. Economies of scale enable DHC systems to employ highly efficient technologies, and to provide the professional management and operation of those technologies, 24 hours a day, to ensure maximum efficiency.

DHC provides opportunities for significant conservation (beyond building envelope improvements) in commercial sector heating and cooling. The energy use characteristics of today's buildings will continue to affect national energy consumption for many years—about 60% of today's housing units will be in use in 2010, according to the DOE. While improvements can and should be made to improve efficiency within buildings, there are limits to what can be achieved in this manner.

Rapidly increasing air conditioning requirements is a key factor in the projected growth in energy demand in the commercial sector. Energy efficiency can be increased by satisfying some of these needs with district cooling.

A key impact that DHC can have on energy efficiency is through cogeneration. Cogeneration becomes feasible on a large scale when combined with DHC, which assembles many thermal loads. Approximately one quarter of U.S. primary energy use is wasted in generating and distributing electricity (35% of primary energy is used by the electric utility sector at an efficiency of about 30%). This presents an unparalleled opportunity for conserving energy resources. Cogeneration can double fuel

use efficiency compared with the separate generation of electricity and thermal energy.

This massive energy waste, and associated environmental impacts, can be addressed through cogeneration. In cogeneration facilities, electricity and heat are produced simultaneously. The heat is then converted to useful thermal energy (hot water, steam or chilled water) for distribution in downtown areas through district heating and cooling systems. District systems are the key to widespread implementation of cogeneration because they distribute the thermal energy to the users.

Instead of producing 30% useful energy, cogenerated district heating and cooling can boost efficiency to over 70% by using the heat that is normally wasted as a by-product of electric generation.

Chlorofluorocarbons (CFC's)

CFCs destroy the protective ozone shield in the stratosphere as well as contribute to global warming. Significant investments will have to be made to upgrade or replace air conditioning systems in commercial and institutional buildings in order to achieve the CFC phase-out goals mandated in the Clean Air Act Amendments. District chilled water can be produced without using CFCs. Technologies which have zero impact on stratosphreric ozone, such a ammonia chillers, can be safely employed in DHC systems but are problematic for individual buildings.

Air Pollution Including Carbon Dioxide

By increasing energy efficiency, DHC systems can contribute to significant reductions in air emissions, including the greenhouse gas carbon dioxide.

Unlike many developed nations, the U.S. hasn't come to grips with global warming. when it does, the options will seem paltry compared with the problem. Cogenerated district heating and cooling will have to be a key element, because it is only in power plants that we generate such vast amounts of carbon dioxide for so little usable energy output. The British government recognized this in their recently-published "White Paper on the Environment," in which cogeneration is singled out as the major strategy for combating global warming.

Renewable Energy

DHC provides the economies of scale necessary to use renewable energy, industrial waste heat and other resources. Renewable energy, such as municipal solid waste, waste wood, geothermal energy and other sources, can be tapped by DHC systems more economically than on an individual-building scale.

Local Economic Development

Use of local energy resources can have a salutory effect on the local economy, as more of the dollars spent on energy flow through the local and regional economy and spin off other economic activity.

Managing Electricity Demand

Demand for electricity is growing faster than overall energy demand, and the DOE has identified the need for 100 gigawatts—about 100 large power plants—of new generating capacity beyond that already planned. Rapidly increasing air conditioning requirements, particularly in commercial buildings, is a key reason that peak electric demand is growing. This is exactly the end-use served by district cooling systems.

How is the nation to meet the growing demand for air conditioning which drives the increase in peak electric demand? It would be folly to simply continue as we have in the past—installing individual chillers in buildings and constructing more electric-only power plants. That is building energy and environmental inefficiency into our infrastructure. Instead, let's build efficiency and flexibility into our infrastructure with district heating and cooling systems.

For example, a district cooling plant, located in or near a downtown area, can cogenerate electricity and steam with a natural gas-fired cogeneration turbine. The steam can be used to drive heat-driven chillers in summer and provide hot water or steam heating in winter. The electricity can be used to run chillers in summer and meet lighting and other needs in winter.

This not only reduces the need to build more power plants—it also helps the environment significantly. The reduction in energy consumption provided by cogeneration can lead to significant reductions in emissions of air pollutants, including the greenhouse gases carbon dioxide and chlorofluorocarbons (CFCs).

Flexibility and Energy Security

District systems also provide enormous flexibility to respond to changing world events and resulting restrictions in supplies or increases in prices of fuels, evidence

of problems with existing technologies (e.g. CFCs), development of new technologies or other opportunities or problems. It is far easier to change equipment, fuels or operations in a central plant than it is in many dispersed facilities.

CONCLUSION

Over 8% of commercial floor space is heated and/or cooled through district heating and cooling. This percentage can be boosted considerably, in energy systems which can increase energy efficiency, reduce air pollution, combat global warming, decrease emissions of ozone-destroying CFC, and reduce the need to build new power plants.

Federal and state policies and regulations must be changed to encourage the development and expansion of district heating and cooling systems.

SUMMARY OF RECOMMENDATIONS

1. Establish DHC as a key element in our national strategy for increased energy efficiency.
2. Encourage the consideration of cogenerated district heating and cooling in electric utility least cost utility planning.
3. Evaluate the benefits of requiring higher thermal energy recovery in Qualifying Facilities under PURPA.
4. Study state processes for bidding for supply of electricity and recommend a process for setting aside a portion of electric supply contracts for cogenerated DHC plants.
5. Eliminate recapture of depreciation upon the transfer of DHC property from a taxable entity to a tax-exempt entity.
6. Eliminate per capita bonding limits and project size restrictions for use of industrial revenue bonds for DHC projects.
7. Identify the most potentially feasible locations for DHC systems and educate the relevant local governments, electric utilities and other key potential participants regarding the benefits and costs of DHC.
8. Increase funding for research, development and demonstration of DHC systems.
9. Facilitate connection of federal buildings to DHC systems.
10. Recommend changes in power plant siting processes to facilitate cogenerated district heating and cooling.
11. Study state and local taxes on systems and recommend a model tax structure which eliminates double taxation on DHC systems.
12. Study state and local regulation of DHC systems and recommend a policy and structure for elimination of rate regulation of such systems.

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